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TECOM Project No. 7-CO-M91-AVD-003

METHODOLOGY INVESTIGATION

FINAL REPORT

AVIATION TEST MANAGEMENT

SYSTEM CONCEPT

IMPLEMENTATION

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MAR 06 1992
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Technical Test Support and Logistics Division

UNITED STATES ARMY AVIATION TECHNICAL TEST CENTER

FORT RUCKER, ALABAMA 36362-5276

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Prepared for:
Commander
U.S. Army Test and Evaluation Command
ATTN: AMSTE-TC-D
Aberdeen Proving Ground, MD 21005-5055

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REPLY TO ATTENTION OF
AMSTE-TC-D (70-10p)

4 FEB 1992

MEMORANDUM FOR Commander, U.S. Army Aviation Technical Test Center, ATTN: STEAT-TS, Fort Rucker, AL 36362-5276

SUBJECT: Methodology Investigation, Final Report, Aviation Test Management System Concept Implementation, TECOM Project No. 7-CO-M91-AVD-003

1. Subject report is approved.

2. Point of contact at this headquarters is Mr. John Schnell, AMSTE-TC-D, amstetcd@apg-9.apg.army.mil, DSN 298-7882.

FOR THE COMMANDER:

FREDERICK D. MABANTA
Chief, Tech Dev Div
Directorate for Technology

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This report covers efforts to implement an automated project management system within an aviation research, development, test, and evaluation organization. This report details the methodology used to outline the desired system and to move from a manual to an automated system. The ViewPoint software package from Computer Aided Management, Inc., was the main focus of the implementation. Problems with the software prevented full implementation of the package. This report also includes a handbook on the use of ViewPoint in an appendix.

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FOREWORD

This study is a continuation of a study conducted last fiscal year ((FY) 1991) to find an off-the-shelf software package which would be compatible with the military test and evaluation (T&E) process. The ViewPoint (VP) software package from Computer Aided Management, Inc., was selected.

The name ViewPoint and details of the program design and menu system described in Appendix B are copyrighted (1989) by Computer Aided Management, Inc. The selection of ViewPoint and evaluation should not be considered an endorsement of the product by the U.S. Army Aviation Technical Test Center (ATTC) or the Department of Defense.

MicroSoft, Windows, MicroSoft Disk Operating System (MS-DOS), and TimeLine are all copyrighted trademarks. The use of these trade names does not constitute an endorsement by the Department of Defense.

For purposes of this report, tasks and activities are synonymous as are events and milestones.

The study team is indebted to the following ATTC employees who participated as beta testers and whose comments were invaluable in conducting this study: Mr. Ken Blackwell, Mr. Al Chapman, Mr. Nam Ros, and Mr. Manuel Venegas.

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SECTION 1. SUMMARY

1.1 BACKGROUND. During fiscal year 1990, U.S. Army Aviation Technical Test Center (ATTC) conducted a methodology study to select a commercial off-the-shelf project management system. As a result of this study, the ViewPoint (VP) project management software was selected (reference (ref) 1, appendix (app) D). The current study was conducted to define implementation details for the selected project management system.

1.2 PROBLEM. The current system of project management within ATTC is loosely based on simply meeting required Test Resource Management System (TRMS) dates. Conflicts often arise in scheduling critical resources. Because resource commitments are not immediately visible to upper-level management, it is difficult to set priorities for these resources. Additionally, it is difficult to quickly determine if resources are available to accept a new test. The current test planning process produces documentation which describes what will be tested and the criteria it must meet, but it does not provide for test execution and progress reporting. Project planning, execution, and reporting could be improved through a coherent, standardized system which addresses these problems.

1.3 OBJECTIVES.

1.3.1 To briefly outline the current project management system within ATTC.

1.3.2 To briefly outline capabilities of the desired system.

1.3.3 To adapt ViewPoint to the desired system.

1.3.4 To prepare "user-friendly" documentation and programmed training for the ViewPoint system.

1.3.5 To prepare a transition schedule from the current system to the desired system.

1.3.6 To receive a command go/no-go decision on the final implementation schedule for automated project management.

1.4 PROCEDURES.

1.4.1 This methodology investigation was not centered around only one test. Rather, it was generalized so that results could be applied to all tests.

1.4.2 The current project management system at ATTC was evaluated to determine strengths and weaknesses.

1.4.3 Specialized training for the ViewPoint implementation team was conducted in October 1990.

1.4.4 From October through December 1990, various key personnel were interviewed to determine how best to set up the ViewPoint program to meet their needs.

1.4.5 From January through March 1991, the first draft of the test director's training manual for ViewPoint was written. Concurrently with this action, templates were constructed for depicting resources and schedules within ViewPoint.

1.4.6 From March through May 1991, personnel unfamiliar with ViewPoint beta tested the test director's training manual.

1.4.7 In June 1991, the commander was briefed by the implementation team on the test director's comments and problem areas identified with the ViewPoint system.

1.4.8 In July 1991, the commander approved a modified implementation plan.

1.5 RESULTS.

1.5.1 The findings of the previous study (ref 1, app D) concerning the current system were confirmed by the interviews conducted. Everyone acknowledged that the current project management system is too reactive.

1.5.2 The capabilities of the desired system were defined by each division and then massaged into a desired system which addressed the entire Test Center. ViewPoint was unable to meet all the requirements of the desired system.

1.5.3 Most test directors were not enthusiastic about any automated system because they felt that either:

a. The information contained in the computer would be used as a weapon against them, or

b. The time and effort to update projects were not worth the benefits they would derive.

1.5.4 The ViewPoint Test Director's Handbook was revised after user comments and published in final form (app B).

1.5.5 Although ViewPoint functioned flawlessly in the stand-alone mode, it exhibited instability during distributed multi-user processing on the local area network (LAN). Limited beta testing confirmed that ViewPoint was unsuitable for use as the primary project management system within ATTC.

1.5.6 After consideration of all available data, the command decided to partially implement ViewPoint; i.e., to encourage its use on large complex projects and by individual test directors.

1.5.7 ATTC decided to study an internally developed system which was compatible with TRMS and current TECOM management indicators.

1.6 ANALYSIS.

1.6.1 Although ViewPoint's performance in the stand-alone mode was stable, its inability to function reliably in a multi-user environment was unsatisfactory. The problem appeared to be related to frequent memory overlays used by ViewPoint when changing from one function to another. To protect against data loss, test directors would be required to save their projects after every change.

1.6.2 The method used to compute and track project direct labor, flying-hours, and other resource usage was not compatible with ViewPoint. ViewPoint expended resources against a specific task within a project. The proprietary database which resource management uses tracks expenditures against the project as a whole. This required double entry of data--once for the current database and once for ViewPoint.

1.6.3 Although ViewPoint could depict project slippage and reschedule resources, it did not communicate the reasons for the slippage. Upper management was still required to track down test directors for information as to project status.

1.6.4 ViewPoint's method of resource representation and reporting was not compatible with aviation-unique requirements, especially in the area of pilot tracking.

1.7 CONCLUSIONS.

1.7.1 The current system of project management for ATTC has been adequately documented.

1.7.2 The desired capabilities of an automated project management system have been defined.

1.7.3 Although an automated system for project management would be helpful, ViewPoint possesses too many problems to be useful. An in-house automated system compatible with current databases and TRMS would be preferable to ViewPoint.

1.7.4 ViewPoint's ability to depict resource commitments for only one resource at a time failed to give upper management the "big picture" required for effective decision making.

1.7.5 The ViewPoint user's manual developed for ATTC is adequate for conducting initial training and as a reference source.

1.7.6 The schedule for transition to the desired system was not accomplished because ViewPoint proved to be unsuitable for use.

1.7.7 The command decided not to implement the automated project management system without further design improvements.

1.7.8 The unreliability of ViewPoint in the multi-user mode makes it unsuitable for use within the ATTC LAN.

1.7.9 To be successful, any automated project management tool must relieve the test directors of mundane work, not create more of it.

1.8 RECOMMENDATIONS.

1.8.1 The Army research, development, test, and evaluation (RDTE) community should have a standardized project management system capable of sharing information and project status across organizational boundaries and compatible with both the resource management and test-and-evaluation communities.

1.8.2 Further design efforts should be made at ATTC to incorporate the project status system, TRMS and data bases, and the project update systems into a single integrated program which is updated from standard TEAM-UP, flight operations, and personnel databases.

SECTION 2. DETAILS OF INVESTIGATION

2.1 GENERAL. The development of the implementation strategy for ViewPoint divided itself fairly easily into seven major parts: defining the current system, defining the desired system, adapting ViewPoint to the desired system, developing test director training, preparing the ViewPoint databases, limited beta testing of ViewPoint using selected projects, and finally use of ViewPoint by all test directors to plan, execute, and report project information.

2.2 DEFINING THE CURRENT SYSTEM.

2.2.1 To define the current method of project management within the organization was not as easy as one might think. There is no standard Army tool or method for planning and executing major or minor tests. TRMS provides some milestone information, but use of Gantt or program evaluation and review technique (PERT) timelines or critical path method (CPM) charts is left to the option of the test director. Most test directors have had little or no project management training.

2.2.2 The current system for project management is depicted in figure (fig.) 2-1. ATTC Regulation 10-1 (ref 2, app D) and ATTC Memorandum 70-12 (ref 3, app D) detail current project management procedures and responsibilities for the Test Center.

2.2.3 A proposed test is initially received by the Plans Branch. The first major decision that must be made is whether ATTC can support the test resource-wise. This process is performed manually by lining out resources using a wall chart to determine windows when resources would be available for conducting a test. If the commander and Plans Branch chief decide to accept the test, a test coordinator from Plans Branch is appointed; then the coordinator begins the initial planning for the test. After coordinating the scope and details of the test, he prepares a manual cost estimate using EAT Form 1020 (fig. 2-2). The accuracy of the cost estimate is a function of the experience of the test coordinator and the personnel on the preliminary test team.

2.2.4 The test coordinator also negotiates with TECOM to establish TRMS dates for the major project milestones. These dates are normally based upon a best-guess approximation. The accuracy of these figures is again not a function of methodology but of experience. After all these tasks have been accomplished, the project is given to a test director in the Test Division for execution.

2.2.5 The test director then prepares the formal test plan. The test plan assists the test director in specifying what must be

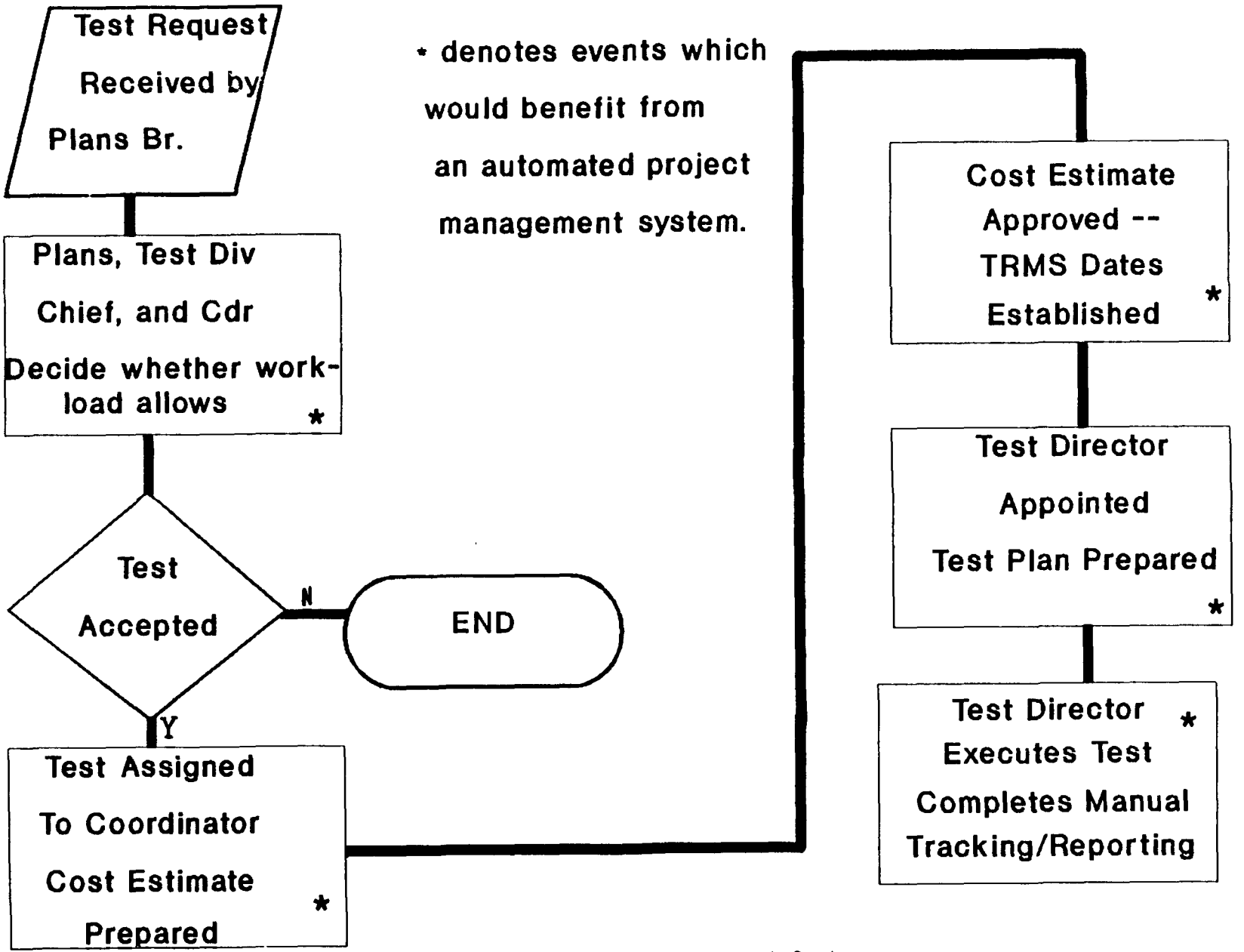

Figure 2-1. Project Management System

ATTC Memo 70-12

TEST PLANNING WORKSHEET
PERFORMING COST CENTER ESTIMATE:

XO CODE: _____ FISCAL YEAR: _____

TECOM PROJ. NO: _____ REVISION: _____

COST CENTER NUMBER: _____

CONTRACTOR NAME: _____ QUARTER

RESOURCE(UNIT)	I		II		III		IV		TOTAL	
LABOR(HOURS)	MIL.	CIV.	MIL.	CIV.	MIL.	CIV.	MIL.	CIV.	MIL.	CIV.
TDY($)										
EQUIPMENT RENTAL($)										
EQUIPMENT PURCHASES($)										
CONSUMABLE PURCHASES($)										
TRANSPORTATION($)										
OTHER($) MUST SPECIFY:										

AUTHENTICATION: COORDINATION:

PREPARED BY: _____ DATE: _____ PROJECT OFFICER: _____ DATE: _____

SUPERVISOR: _____ DATE: _____ TEST COORDINATOR: _____ DATE: _____

EAT Form 1020, 1 Oct 90, replaces EBG Form 1044 which is obsolete.

Figure 2-2. Test Planning Worksheet

done and what criteria must be met; but it does not help establish a schedule of testing, show where critical bottlenecks of resources might occur, or depict what resources are committed against what tasks. The test plan then helps in the planning phase, but fails to provide the necessary assistance in the tracking and execution phases of a project.

2.2.6 For interim status reports on test progress, the test directors use TRMS dates as the guide for timeliness and direct labor/dollar indicators from TEAM-UP and other resource management (RM) databases for resource tracking. Unfortunately, TRMS dates are based upon best-guesses and, therefore, are really invalid for use as tracking mechanisms because they are artificially imposed and not based upon test or resource capability. This emphasizes the project management maxim--you can con a test director into accepting unreasonable milestones, but you can't bully him into meeting them. Likewise, the current method of accounting for direct labor is at a gross project level and can't be identified at the individual task level. Also, we have already stated that resource estimates are rough approximations so that resource expenditures reported by TEAM-UP are not related to actual percent of project completion.

2.3 DEFINING THE DESIRED SYSTEM.

2.3.1 Determining what was desired in a project management system for ATTC involved interviewing various line and staff managers and Test Division personnel to ascertain what they would like in an ideal system. In some cases the desires of upper management and the test directors were incompatible. For example, project status information was discussed. Upper management wanted an open system; i.e., total visibility of all project information to all users. The test directors wanted protected information or hidden information to be available. (This demonstrates the project management maxim--project managers detest progress reports because they show how little progress has actually been made.)

2.3.2 The following paragraphs describe the desired features of a project management system which incorporates some compromises between the worker and management ideals.

a. The desired system should provide for resource commitment information to be displayed in real time so management can make an intelligent decision as to whether to accept a test based upon resource availability.

b. Cost, resource requirements, and milestone information should be based upon proper project management principles and planning--not upon guesses and past experience alone. The desired system should provide the capability to compute an accurate cost estimate given the work breakdown developed to

accomplish the test. Ideally, the system should provide a templating function which would allow rapid prototyping of similar projects.

c. The desired system should allow TRMS dates to be derived from actual project time requirements. This would make TRMS dates accurate milestones of project execution, not artificial time constraints.

d. The desired system should provide the bridge from test planning to test execution and reporting. It should be a road map from start to finish of all tasks required to be accomplished and the order in which they are to be accomplished. As the system is used over time, a library of projects should be built up which provides the new test director with an instant experience base. The system should track expenditures of resources to accomplish various phases of the project but should also display resources at the macro level for the test as a whole.

e. Project status information should be available in real time to management to accurately derive resource availability and usage. The desired system should allow test directors to track resource expenditures without increasing their current workload.

f. The desired system should show critical areas where resource commitment is necessary to prevent project slippage (critical path) and areas where slack time is available.

g. The desired system should operate reliably on the LAN and provide both individual and multiple project monitoring.

h. The desired system should be easy to use, and formal training should be minimal. Self-paced individualized training would be preferred.

2.4 ADAPTING VIEWPOINT TO THE DESIRED SYSTEM.

2.4.1 ViewPoint was an off-the-shelf automated project management tool developed by Computer Aided Management (CAM), Inc. ATTC evaluated several competing packages in a previous study (ref 1, app D), and ViewPoint was selected as the most suitable for our desired system. This evaluation was performed on version 4.0.

2.4.2 Ira Blitz Associates and CAM conducted specialized training on ViewPoint. Training was focused on the top-down design of projects and on basic user familiarization. ViewPoint was furnished with two manuals (ref 4 and 5, app D) which covered the technical reference and presentation graphics for the system.

2.4.3 The key to using ViewPoint was the development of a good top-down structured design for the project. This involved first the design of a good tree-oriented work breakdown structure. Figure 2-3 depicts the network planning screen in ViewPoint with a typical work breakdown structure in place.

2.4.4 The tree-oriented approach allowed resources and cost information to be portrayed across any phase of a single project or across multiple projects. This was done very simply on the screen by highlighting a node on the tree. All information acquired would then relate only to that node and the ones below it, but would not include nodes at the same level or higher. The top node represented top management and was the commander level. Below this were the various major projects which normally equated to an expenditure order (XO) code. The major phases of test work to be conducted followed the major projects. For aviation testing, these phases were almost always planning, instrumentation, ground testing, flight testing, data reduction, and reporting. Some simple tests might have only two or three of these nodes present.

2.4.5 Once the network tree was designed, specific tasks were entered within each node and linked together to produce a Gantt chart using CPM. The critical path through the project was depicted in red while tasks with slack were shown in blue. Resources were then assigned against each of the tasks.

2.4.6 Once the test director had assigned resources and expenses to the tasks, the resource commitments were visible to upper management. The commander could easily import any number of projects and connect them to his upper node in the tree. Resource utilization could then be depicted at any level within ATTC. This capability partially satisfied the requirement in paragraph 2.3.2a of the desired system. ViewPoint was unable to totally satisfy this requirement because it could only display one resource at a time. This failed to give a sufficient picture for management to make effective decisions. For example, if we were trying to determine our capability to conduct an Apache test, ViewPoint could depict AH-64 aircraft requirements or AH-64 pilot requirements, but could not simultaneously overlay the two.

2.4.7 By using the structured approach to planning that ViewPoint required, the test director is encouraged to plan his project and assign resources thoughtfully. While ViewPoint cannot turn a poor plan into a good one, it can derive accurate information from a plan which is put together a small piece at a time. This helps the test director to break down a complex project into bite-sized elements which can be accurately modeled. Because the resulting milestone information is based upon an accurate model of the total project requirements rather than a best-guess, the milestones can now be used for accurate project tracking information. By getting a resource and expense summary

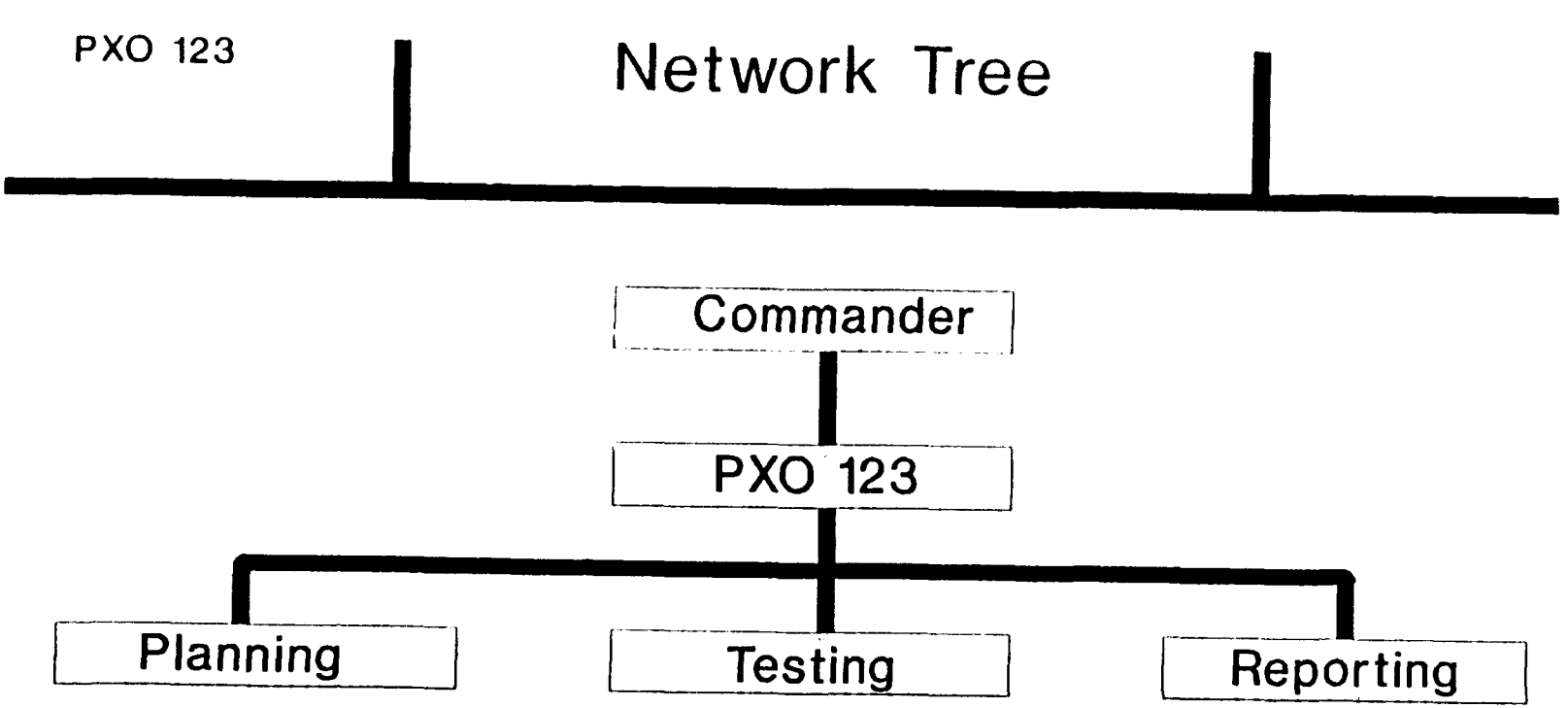

Figure 2-3. Network Tree

for the project as a whole or any part of the project, a fairly accurate cost estimate can be prepared in short order. During the planning phase, ViewPoint does allow the importation of libraries of tasks and resources which gives a templating function useful in reducing the amount of original work that must be done. These ViewPoint capabilities met the requirements of paragraph 2.3.2b of the desired system.

2.4.8 ViewPoint will adjust events to compensate for changes in task accomplishment and resource use/availability. From the initial planning data, the TRMS events can be extracted giving them real-time oriented meaning in relation to project accomplishment. As the project goes into execution and events slip because of delays, the slippage is depicted graphically on the screen. This means that TRMS dates are always accurate, and the need to adjust TRMS data is immediately apparent even months down the road. This capability satisfies the requirement of paragraph 2.3.2c of the desired system.

2.4.9 After the project has been planned and entered into ViewPoint, the tasks and their sequence--presented graphically on the screen--provide a simple path for the test director to follow to reach project termination. If the test director should later change, the new director would simply view the network screen and be provided a graphical road map to project completion. ViewPoint generates numerous hardcopy reports which can assist in project reporting requirements. Because ViewPoint runs in a multi-user real-time mode on the LAN, test directors have access for viewing all current and recent projects. This can greatly reduce planning time, as similar projects can be templated for rapid development. ViewPoint meets the requirements of paragraph 2.3.2d of the desired system.

2.4.10 ViewPoint provides the capability to track project execution from start to finish both by duration and by resource expenditure. The current status of the project can be quickly ascertained by viewing the TRACK mode. The current status date and completed tasks are shown graphically on the screen. Unfortunately, the ease of viewing the current status did not equate to the ease of actually updating the status information. Updating resource usage and progress toward project completion was clumsy and time-consuming. ViewPoint tracks all status at the individual task level. The current ATTC management information system (MIS) tracks resources at the project level. There is no way to correlate the current database information with required inputs to the ViewPoint databases. This required the test directors to, in effect, make double entries into the computer. One entry was required to update the ATTC MIS and one entry to update ViewPoint. Instead of assisting the test director, ViewPoint became an additional burden. ViewPoint failed to meet the requirements of paragraph 2.3.2e of the desired system.

2.4.11 ViewPoint uses the standard CPM to compute project durations. After making forward and backward passes through the project, ViewPoint graphically depicts the critical path by coloring the tasks red along the path. All tasks not on the critical path (i.e., those with slack) are blue. ViewPoint's ability to rapidly show the critical path was excellent. The accuracy of the critical path was a function of how accurately the test director had planned the tasks, connected them, and assigned resources. ViewPoint met the requirements of paragraph 2.3.2f of the desired system.

2.4.12 ViewPoint is a very large program requiring 450K free random access memory (RAM) after DOS and TSR requirements have been met. When the program was originally tested, the stand-alone mode was used on a single PC. During all tests, it performed reliably and with no detectable bugs. After installation on the LAN, ViewPoint began to operate erratically. After eliminating all other alternatives, ATTC determined that the program itself was causing the error. ViewPoint's large size and complexity cause it to use numerous memory overlays which are loaded as needed. Since the instability normally occurs when changing modes (which requires a new overlay to be loaded), there appears to be some conflict between the ViewPoint memory manager and the LAN. This instability became worse as more users were added to the system. Since ViewPoint was beta tested by a relatively small number of test directors, the problem could be expected to be unmanageable with everyone at ATTC attempting to use it. We upgraded ViewPoint from version 3.1 to version 4.0 but did not see a significant improvement in its stability. ViewPoint's instability in the multi-user mode was totally unsatisfactory and failed to meet the requirements of paragraph 2.3.2g of the desired system.

2.4.13 ViewPoint is a graphically oriented system using tables and forms to allow data entry. It is especially easy to use if a mouse is attached to the computer. The test director can use the mouse to set up the connections, events, and tasks required to define the project. Setting up the basic diagram is fairly straightforward. Assigning resources and expenditures is a little awkward but easily accomplished. Posting progress, as already noted, is cumbersome and time-consuming. The requirement for formal training for this program is minimal, provided an adequate self-paced instruction manual is developed. ViewPoint met the requirements of paragraph 2.3.2h of the desired system.

2.5 DEVELOPING TEST DIRECTOR TRAINING.

2.5.1 Developing the test director training was driven primarily by the need to have minimal impact on the normal test schedule of ATTC. Additionally, it was recognized that lecture or classroom type training was unsuitable for learning a computer tool. The only way to really learn ViewPoint was to use ViewPoint.

2.5.2 To meet these needs, a self-paced hands-on training/ reference manual was developed. The Test Director's Handbook is included at app B. This handbook allowed the new user to work through a three-part practical exercise (PE) which demonstrated all the major capabilities of ViewPoint.

2.5.3 Selected test directors, some of whom were not computer literate, beta tested the manual. This testing identified some problems with the PE which caused certain portions of the first PE to be rewritten. During the beta testing of the manual, other problems with ViewPoint surfaced which are identified in paragraph 2.7.

2.6 PREPARING THE VIEWPOINT DATABASES.

2.6.1 ViewPoint uses six basic relational databases to hold an individual project's description. Of these six, all but two are automatically created and updated while the test director is planning his project. The RESOURCE and BUDGET CODE databases required preparation and development by the implementation team.

2.6.2 The RESOURCE database lists all resources available for project planning. Also included in this database are the descriptions and costing information for each resource. The fields within this database are: resource name, resource group, resource description, billing rate, and unit of measure.

2.6.2.1 In determining how to develop this database, several decisions were made. The first decision was how detailed would we make the resource name. We were basically confronted with two options: to account for pilots and aircraft at the macro level (i.e., AH-64 pilot or AH-64 helicopter) or at the micro level (i.e., MAJ Waters or 80-22765). Because most of our resource conflicts were at the micro level, we decided to account for resources by tail numbers and persons' names. This would allow detailed resource information to be available.

2.6.2.2 The resource group field is only used by ViewPoint for printing reports and is not used by the actual project management software. For personnel, we decided this field would contain the cost center, (i.e., CC 450) and for aircraft, it would contain the aircraft type. We elected not to develop specialized group codes in order to maintain some compatibility with the current resource management accounting system.

2.6.2.3 The resource description is basically a 30-character alphanumeric field to hold a brief description of what the resource actually is. Again, this field is not used for actual project management functions but for information in report generation.

2.6.2.4 The billing rate and unit of measure fields really go together and are used by ViewPoint to develop the cost and expense estimates for the project. There are an infinite number of combinations of representing rates and measures, but we settled on using a standard 1-hour unit of measure. This allowed maximum compatibility with the current resource management system. For personnel assets, we used the billing rate equal to the direct labor rate charged to the customer. For aircraft, we used the standard Army flying-hour cost for that type airframe.

2.6.3 The BUDGET CODE database contains user-defined codes which could be used to selectively limit the scope of the resource name selected. Paragraph 2.6.4 discusses how this was achieved. This database contained three fields: budget code name, budget code group, and budget code description.

2.6.3.1 The budget code name is the only field used by ViewPoint in the project management algorithm. We decided to use the budget code field, not for financial information, but as a further refinement of the resource name in the resource database. As such, the budget code name contained entries such as: AH-64 Pilot, U-21 Pilot, UH-1 Aircraft, Contractor, Flight Test Engineer, etc.

2.6.3.2 The budget code group allowed the grouping of various budget codes when making hard copy reports. We used such entries as pilots, aircraft, and engineers.

2.6.3.3 The budget code description simply allowed a descriptive alphanumeric entry to be prepared for each budget code.

2.6.4 The combination of resource names and budget codes allows a detailed resource report to be presented from the project management software. For example, we could display the total workload for MAJ Waters by selecting the resource name = MAJ WATERS and budget code = Any. To limit the display of the workload of a specific resource, you would select resource name = MAJ WATERS and budget code = UH-1 pilot. This would represent the resource's work only as a UH-1 pilot. To see the total requirement for all UH-1 pilots, you would set resource name = Any, and budget code = UH-1 pilot.

2.7 VIEWPOINT BETA TEST.

2.7.1 Personnel with varied computer backgrounds beta tested the ViewPoint software. Some beta testers were very fluent in computers and had experience with Timeline and other project management systems. Others had almost no computer background. The experienced user had more complaints about the ViewPoint package.

2.7.2 ViewPoint comes with a presentation graphics package which will prepare high quality charts and reports. This package must run under MicroSoft Windows. The output is so slow that the program is practically unuseable. Further, Windows is not installed on the majority of PCs within ATTC making the program virtually useless. Beta testers all agreed that they could draw the charts by hand faster than ViewPoint could produce them.

2.7.3 The standard ViewPoint project management system runs under MS-DOS and was provided in a stand-alone and LAN version. ATTC had a license for one stand-alone PC and a site license for the LAN version which allowed multiple users. As previously noted in paragraph 2.4.12, ViewPoint was unstable during LAN operation. Beta testers found that the system would simply "lock-up" during operation. The program could not recover, and the only solution was to reboot the PC. All data entered since the last "save" operation were lost. This instability normally manifested itself when changing from one screen to another and varied from a nuisance to major data loss. Also, during some save operations, the project would be written to disk in a garbled form, destroying all previous data. This instability alone was sufficient to render ViewPoint unsuitable for use throughout ATTC.

2.7.4 The beta testers were able to conduct project planning using ViewPoint without too much problem. Resource assignment was a little more difficult. The concept of fixed vs. elastic resource commitment was difficult to impart to the testers, and there was confusion over when to use each method. Using the wrong type of commitment affected the accuracy of the computed timeline and milestone information.

2.7.5 The method of displaying resource information had two drawbacks which the testers identified--the number of resources depicted and the accounting for a resource's maximum capability.

2.7.5.1 ViewPoint can only depict one resource at a time on the screen. All management users agreed that this was insufficient to meet their planning needs. The system had to be able to depict pilots and aircraft together in order to be useful.

2.7.5.2 ViewPoint was unable to keep track of the maximum resource commitment that an individual resource could perform. This was especially critical in aviation testing. An individual resource might be a pilot for several different aircraft. ViewPoint had no way to identify which aircraft an individual resource was qualified to operate. Although flight operations maintained a database of pilot qualifications, ViewPoint was unable to access and use that information. Test directors were still required to use a "stubby pencil drill" to keep up with resource information.

2.7.6 Project tracking was clumsy and confusing for most of the beta testers. Each task had to be updated for both resource and time expended. Resource updates were not intuitive, and user interface was poor. Further, attempting to put resources against some tasks was disallowed by ViewPoint depending on the linkage of the tasks.

2.7.7 The requirement to perform double entry of data was unsatisfactory to all testers. ViewPoint's incompatibilty with current ATTC databases rendered it a chore rather than an aid.

2.8 FINAL IMPLEMENTATION DECISION

2.8.1 The ViewPoint study team presented overall findings to the ATTC command and staff. After discussion of general findings, the major areas of concern were the LAN instability, double entry of data, and single resource displays.

2.8.2 The command group determined that ViewPoint was unsuitable for use as a standardized test management system at ATTC. The study team was directed to combine existing software including the Project Status System and Project Update System into a reporting system which would help meet the requirements of upper management.

SECTION 3. APPENDICES

APPENDIX A. METHODOLOGY INVESTIGATION DIRECTIVE

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005

REPLY TO ATTENTION OF

AMSTE-TC-D (70-10p)

10 DEC 1990

MEMORANDUM FOR Commander, U.S. Army Aviation Technical Test Center, ATTN: STEAT-MP-P, Fort Rucker, AL 36362-5276

SUBJECT: Amendment 1 to Test Execution Directive, Test Technology Development, Test Process Improvement, and Artificial Intelligence Programs

1. Reference memo, HQ TECOM, AMSTE-TC-D, 25 Oct 90, subject: Test Execution Directive, Test Technology Development and Test Process Improvement Programs.

2. This memo, with list of investigations at encl 1, amends reference 1. Note change in subject as above.

3. Point of contact at this headquarters is Ms. Cynthia McMullen, AMSTE-TC, amstetcd@apg-9.apg.army.mil, DSN 298-7878/7881.

FOR THE COMMANDER:

Encl

FREDERICK D. MABANTA
Chief, Technology Development Division
Directorate for Technology

D628.41 TEST PROCESS IMPROVEMENT (OLD METHODOLOGY)

	AVIATION TECHNICAL TEST CENTER	INITIAL FUNDING
7-CO-M91-AVD-001	FY91 Quick Reaction Methodology	50.0
7-CO-M91-AVD-002	FY91 Technical Committee Support	5.0
7-CO-M91-AVD-003	Avn Test Mgt System Concept Development	33.0
	TOTAL ATTC PROGRAM	88.0

D628.41 TEST TECHNOLOGY DEVELOPMENT (OLD RDI)

	AVIATION TECHNICAL TEST CENTER	INITIAL FUNDING
7-CO-R91-AVD-001	Data Cockpit Display	80.0
	TOTAL ATTC PROGRAM	80.0

D628.42 ARTIFICIAL INTELLIGENCE PROGRAM

	AVIATION TECHNICAL TEST CENTER	INITIAL FUNDING
7-CO-A91-AVD-001	AI APPLICATIONS II - RAM	40.0
7-CO-A91-AVD-002	AI APPLICATIONS II - AC AIRWORTHINESS	10.0
	TOTAL ATTC AI PROGRAM	50.0

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005-5055

REPLY TO ATTENTION OF

25 OCT 1990

AMSTE-TC-D (70-10p)

MEMORANDUM FOR Commander, U.S. Army Aviation Technical Test Center, ATTN: STEBG-MP-P, Fort Rucker, AL 36362-5276

SUBJECT: Test Execution Directive, Test Technology Development and Test Process Improvement Programs

1. Reference:

a. Draft TECOM Regulation 70-17, 1 Jul 89, TECOM Methodology Improvement and Standardization Programs.

b. Draft TECOM Regulation 70-18, 1 Jul 89, Research, Development and Acquisition, Instrumentation Development and Acquisition.

2. This memorandum authorizes the execution of the projects listed in enclosure 1 under the TECOM Test Technology Development and Test Process Improvement (formerly Research and Development of Instrumentation and Methodology Improvement) programs. Detailed project descriptions listed in the FY91-97 Master Mind and IDAP database are the basis for headquarters approval of the projects.

3. Upon receipt of this directive, review TRMS II database test milestone schedules established for the projects and enter any necessary reschedules directly into the TRMS database with appropriate justifying narrative.

4. All safety, health, energy, and environmental issues associated with the project will be considered and necessary documentation or support studies/information/approvals required will be accomplished/prepared prior to project initiation. Security/OPSEC requirements will be adhered to.

5. All reporting, including final technical reports prepared by contractors, will be in accordance with the requirements and appropriate formats as specified in the references. Final reports will be reviewed and approved by the headquarters technology program panel. Test centers must be prepared to send the project officer or a representative to brief the panel if necessary. All Methodology projects must specifically result in either a TOP, a software/simulation program, or an IDAP submission in order to be approved.

AMSTE-TC-D
SUBJECT: Test Execution Directive, Test Technology Development and Test Process Improvement Programs

6. FY91 RDTE funds authorized for the projects are listed on enclosure 1. GOA form 1006 will be forwarded by the TECOM Directorate for Resource Management, and will be updated to reflect all changes to current program. A cost estimate is to be submitted within 30 days following receipt of this directive.

7. Point of contact at this headquarters is Mr. James Piro, AMSTE-TC-D, amstetcd@apg-9.apg.army.mil, DSN 298-3677/2170.

FOR THE COMMANDER:

Encl

FREDERICK D. MABANTA
C, Technology Development Division
Directorate for Technology

	FY91 D628 TEST PROCESS IMPROVEMENT PROGRAM AVIATION DEVELOPMENT TEST ACTIVITY	INITIAL FUNDING
7-CO-M91-AVD-001	FY91 Quick Reaction Methodology	50.0
7-CO-M91-AVD-002	FY91 Technical Committee Support	5.0
7-CO-M91-AVD-003	Avn Test Mgt System Concept Development	33.0
	TOTAL AVNDTA PROGRAM	88.0

	FY91 D628 TEST TECHNOLOGY DEVELOPMENT AVIATION DEVELOPMENT TEST ACTIVITY	INITIAL FUNDING
7-CO-R91-AVD-001	Data Cockpit Display	80.0
	TOTAL AVNDTA PROGRAM	80.0

APPENDIX B. VIEWPOINT TEST DIRECTOR'S HANDBOOK

ViewPoint
TEST DIRECTOR'S
HANDBOOK

PREFACE

This handbook is for the use of U.S. Army Aviation Technical Test Center (ATTC) test directors and engineers. Its purpose is to provide information necessary for the efficient use of the ViewPoint project management computer software.

To use this manual, first read Chapter 1, Introduction to Project Management and the Critical Path Method; then read Chapter 2, Introduction to ViewPoint. Lastly, go to Chapter 5 and work through the ViewPoint practical exercise. This will give you an overall idea of ViewPoint's capabilities and limitations in managing your project.

ViewPoint is a powerful tool which can help you to effectively plan, execute, and report on your projects. It also gives your projects visibility to upper management so they can identify resource bottlenecks and set priorities for conflicting project requirements.

ViewPoint and related software are copyrights of Computer Aided Management, Inc. The screens shown in the appendices and the software itself are for the sole use of ATTC and will not be copied or used for private purposes.

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CHAPTER 1. INTRODUCTION TO PROJECT MANAGEMENT AND CPM

Basic information on how to conduct a project and write reports for ATTC is found in other ATTC publications. The basic project management information here is just enough so you can use ViewPoint effectively.

First, we need to define some basic terms. A project is an undertaking with specific objectives which has a finite life, defined objectives, funding limits, and that consumes resources. Project management encompasses the factors of planning and monitoring to achieve project objectives. During the planning of a project, the project manager (test director) defines the work requirements, the quantity of work to be performed, and the resources required. During the monitoring phase, the test director tracks the progress of the project, analyzes problems, and makes adjustments to the work plan of the project. Project management is an extension of the five basic management functions --planning, organizing, staffing, controlling, and directing-- merged with the need for extraordinary communication skills in both the vertical and horizontal plane. To effectively implement project management, trained people are required.

An excellent book to refer to is Project Management by Harold Kerzner (available at the Aviation Technical Library) which discusses both basic project management and the use of automated tools to assist in management. Of course, there is always resistance to the use of anything new, and this handbook describes several reasons why computer tools fail. The major reason that most software tools fail (assuming the employees actually tried to make them work) is because the organization lacks training in project management principles. Ultimately, this is an underlying cause of all other failures. There is not time to formally train each test director in project management. This type training will have to be mostly self-study; however, ViewPoint can assist in forcing you to follow good project management principles by making you have a plan and helping you to execute that plan. The second most common cause for failures is when the organization's structure is not appropriate to meet project planning and management needs. The organization of ATTC into a project-driven (matrix) type organization should facilitate planning and prevent this from being a valid reason for failure.

The use of project management software also requires strong internal lines of communication--test directors, functional managers (branch chiefs), and line managers (division chiefs) must talk with each other. ViewPoint is not a substitute for communication or interpersonal skills; it simply enhances planning, monitoring, and execution of projects.

Just like a hammer is not a substitute for carpentry skills, ViewPoint is not a substitute for project management skills. Each is just a tool to help you accomplish the mission. Giving out a tool with no training is dangerous, as anyone knows who has hit their finger with a hammer! Hopefully, this handbook will give you the training to prevent a lot of pain, agony, and personal injury in using ViewPoint for your project.

CPM

Because ViewPoint (VP) uses CPM, a brief introduction to CPM is necessary to understand the program's operation.

CPM is a technique of scheduling which assists in planning and controlling projects. This technique uses a network to depict logical or resource-constrained relationships between activities (subdivisions of a project) and events (distinguishable points in time that coincide with the beginning and/or end of activities; checkpoints or milestones). CPM identifies the critical path through a project, i.e., the longest path through the network. The length of the critical path is the minimum time required to complete the project and is called the project duration.

Some advantages of using CPM in project management are:

a. Test directors are forced to explicitly state the activities' logical sequence.

b. Resources (manpower, equipment, funds, and facilities) can be analyzed and scheduled.

c. Test team members have a graphic representation of their assigned tasks and the tasks' relationships to the overall project.

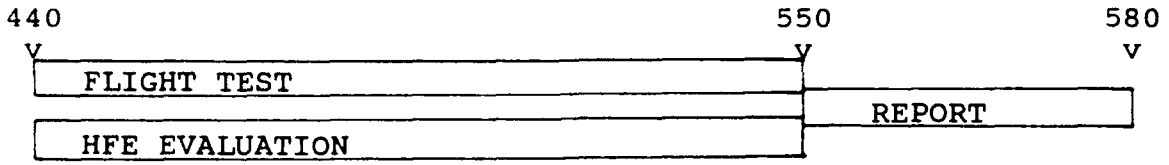
d. The impact of proposed changes or loss of resources to a project can be quickly analyzed.

e. Commanders and managers have a tool with which to control project execution.

The first step in using CPM is to construct the network diagram. You must remember that the diagram is to assist in the planning and control of your project, so its level of detail should be no greater than what you need to manage and report on the progress of the project.

CPM depends on the linkage of events and activities. The concept of an event is key to developing the network diagram and is simply stated as:

For an event to occur, all activities which precede the event must be complete. Until an event occurs, activities that follow the event may not begin.



In the diagram above, the activities Flight Test and HFE Evaluation cannot begin until event 440 occurs. Event 550 cannot occur until the activities Flight Test and HFE Evaluation are completed. Once event 550 occurs, then the report activity can begin. You can see that events are really just small goals that we wish to accomplish during the project. They have no duration and consume no resources.

On the other hand, activities have duration (normally in days) and consume resources. You must determine three basic facts before placing an activity into the network:

a. What must be done before starting this activity?

b. What activities can be accomplished concurrently with this activity?

c. What activities can't begin until this activity is completed?

Other constraints may be added to the activities, such as lead and lag times to account for delivery of items, for interface to other networks, etc.

Time estimation for the duration of an activity can be accomplished in many ways. It may be dependent upon resources; for example, a pilot may only be available for 10 days. Likewise, the duration may be artificial, i.e., you are told that the entire test may take only 15 days. Generally though, you will have to estimate the approximate time each activity will take. There is a simple formula which you can use to determine the duration of an activity and which statistically should give a reasonable estimate:

duration = (optimistic time + (4 times most likely time) + pessimistic time) divided by 6.

The optimistic time is the shortest time that the activity could reasonably be expected to take. Likewise, the pessimistic time is the longest or worst-case time the activity might take. Of

course, the most likely time is the time you believe the activity would take if performed under the same conditions many times. For example, assume the activity Flight Test must be given a duration. Optimistically, if weather, instrumentation, and aircraft are all cooperative, the activity could be completed in as little as 4 days. Of course, lately the weather has been foggy and instrumentation has been inoperative, so the worst-case for the activity could take 15 days. From past experience though, you think it probably will take 7 days. The estimated duration of the activity would be:

(4+(4*7)+15)/6 = 8 days

After the network is drawn with the events and activities and the durations have been entered, a left-to-right "forward pass" is made through the network. During this pass, the earliest start date for each activity is computed. Viewpoint automatically does this forward pass for you. This then comprises the "early schedule" and determines the project duration.

Next, a right-to-left "backward pass" is made through the system, and the latest start date for each activity is determined. This pass then establishes the late schedule.

Those activities whose late schedule and early schedule are identical are considered the critical path. Another way to look at this is that the difference between the early schedule and the late schedule is the amount of float or slack time available. If an activity has float, it can slide without causing the project as a whole to slide. An activity on the critical path has no float, so any delay on a critical activity causes the whole project to slide.

Fortunately, ViewPoint does all the computations for you and will visually depict the critical path through your project. The critical path will be shown in red while activities with float will be depicted in blue.

This brief introduction to CPM is enough for you to be able to effectively use the ViewPoint network planning screens. For more details on manually preparing CPM charts, refer to CGSC (Command and General Staff College) Student Text 25-1.

CHAPTER 2. INTRODUCTION TO VIEWPOINT (VP)

VP is a software program which enhances project management. VP aids in the planning, execution, and status reporting of activities in each project. VP can also roll-up projects for management review of overall committed resources and status.

To enter VP, go to the ATTC Applications menu and select ViewPoint. VP will automatically run and give you the initial menu. From this menu, select the project you wish to run. If this is your first session with VP, select the BUILD or BASIC project. BASIC is a project template that has all the government holidays and weekends already entered and designated as nonwork days. Further, this template has the standard ATTC resources already entered in the resource table. BUILD is a project template with only weekends shown as nonwork days, and it has no resources or codes entered in the tables.

Most of the work in VP is done in the network planning screen. Here the test director designs his project using events and activities. An event is a milestone that occurs at a specific time but does not consume resources or have a duration. On the other hand, activities are those tasks that are performed in between events and have a duration and consume resources.

The first step to using VP is to layout a model of your project using events and activities. Events (milestones or goals) are initially placed in the planning screen. Then the activities which will take place during the project are entered. The next critical step is to connect these activities and events so that they make an accurate model of what must happen and in what sequence.

There are three types of connections available in VP: finish-to-start, start-to-start, and finish-to-finish. The finish-to-start connection is used to show that an activity or event must precede another. The start-to-start connection shows that the activities or events can start simultaneously. The finish-to-finish connection is not often used but shows that events must end together.

For each type of connection selected, a lag time can also be entered. This lag time allows a greater degree of modeling accuracy. For example, to show that activity A can start 3 days after event 2 occurs, you would use a finish-to-start connection from event 2 to activity A with a lag of 3.

This all sounds confusing; but if you work through the PE in Chapter 5, it should become clear to you. Remember, all you are doing is putting into the computer the steps you will be taking to complete and accomplish your project.

Once you have all your required events and activities entered and connected, VP will compute the critical path. This critical path through the network will be shown in red. Activities shown in blue have float and can slide without causing the entire project to slip.

Finally, to complete the project plan, you must assign resources to the project. These resources are stored in the resource table. For your project to merge successfully with other projects in the plan, you need to use the BASIC template file to get started. If you use BUILD, you would have to enter all resources manually.

At this time, go to Chapter 5 and work through the PE. When you have completed the PE, you should be able to plan a project on your own. The remaining chapters contain technical reference material and multi-project management information which will aid you with any specific problems encountered.

Good Luck!

CHAPTER 3. USING MULTIPLE AND COMPLEX PROJECTS

Before using the techniques and information in this chapter, you should have completed all three phases of the PE in Chapter 5.

Occasionally, commanders, directors, and division and branch chiefs will need to simultaneously look at all projects in ATTC. To do this, run ViewPoint as normal. Instead of loading a project from files as usual, select new. From the planning screen, push F5 to get the network tree. The cursor should be at the top level. Now press F7 to import projects. Select the project name to view. Continue pushing F7 and loading projects until you have all the projects you want to roll up loaded below the top level. Now, point to enter the top network. If you select resource or expense profile, you can get the overall resource use for the entire Test Center. You can also constrain and level resources and see their effects on the project load for the entire Test Center.

To view individual project progress, you can go to the TRACK mode and move from network to network (via F5, the network tree).

Two methods can be used to set resource priorities. The first is to use the network tree (F5) to go to the lowest priority project. Enter that network (by pointing) and get a resource profile. Then constrain that project's resource use at a low level (or zero). Now if you go back to the top level, you can get a profile and see if that helped. If not, you may have to go to the 2d lowest priority and constrain that to near zero, etc. Remember, you can use the TRACE function (t key) to find which project activities are using the resources.

The second method of setting resource priorities is by using Activity Code 3. The higher the ASCII value of the first character, the higher the priority. Therefore, Z has a higher priority than A; 9 has a higher priority than 1. (Note that 2 is a higher priority than 11 because only the first character is used). The easiest way to assign priorities is to have the test directors prioritize their activities based upon your guidance as they plan their projects. However, there are advantages to only management assigning the priorities. If you desire to set priorities for the projects, enter the planning screen, press F9 and select activity code editor. Now you will be able to enter the priorities based upon the project's activities. If you do this from the top level, you will get a table with every activity and project in ATTC. An easier way would be to move down the tree to a network in a project you wish to assign priorities. Press F10 to enter LOCAL mode. If you get the activity code editor table, it will only be for those activities in this network of the project.

Some potential problems in multiple project management are:

Calendars - VP only allows 10 active calendars. If some test directors have created numerous individual calendars, each with its own name, VP can quickly reach its limit. VP then will refuse to load any more projects that have additional calendars. This problem can be overcome if everyone uses the STANDARD calendar from the BASIC file. If a test director needs a specialized calendar, i.e., 6 days per week or 7 days per week, he should name it consistently and let everyone know so all users name their calendars identically (if they are the same). In this way, 10 calendars should be enough.

Status Date - VP will not allow projects with different status dates to be loaded together. It is important that the test directors update their projects consistently, on the same date.

Resource/Budget Codes - It is important that resources/codes be named consistently; when VP loads multiple projects, it overlays each resource table. If one person has R.Waters, one has Robert Waters, and one has MAJ Waters in the table, VP will think there are three different resources when actually they are the same. Each test director should be encouraged to use the BASIC file to create his project so inaccurate resource profiles do not occur.

Besides handling multiple projects, VP may also be used to handle very complex individual projects. To begin a complex project, look at app D. This is a guide to using VP in a complex project like the RAH-66. It tells you how to get the right people together and what to discuss. The major steps follow:

1. Define and locate overall goals. (Remember these are events).

2. Define and locate major tasks. These will be summary tasks at the top level and should cover major phases of the project. This will help you organize your code use for summarization.

3. Define key events that are associated with major tasks. These events are not overall project goals (step 1) but are necessary for interproject controls.

4. Connect together key events.

5. Create the network tree. Press F5 and use the shift-arrow combination to create a network for each major task that you identified.

6. Switch to MANUAL mode. Point to AUTO to change to manual. This is to prevent frustrating delays as you do extensive planning and connecting.

7. Copy the summary task's key events into the appropriate network.

8. Create the subplan. Make the events and activities unique to this phase of the test. If its overly complex still, you may need more summary tasks and more subnetworks. Make all the connections within this subnetwork.

9. Now make the connections from the top level to the lower levels in the network.

10. Now calculate. Point to CALC.

11. Make a connection check. Look at the summary tasks at the top level. They should be in order and have the proper duration.

12. Now do the same steps for every major subtask until the tree is complete.

13. Complete connections to the top level.

14. Now switch to AUTO.

15. Make a final check. Point to the first event. In the target start field, enter some future date and accept. Now look at the project. All events/activities/summary tasks should have shifted smoothly to the future with all relative connections the same. If everything is a jumbled mess, move the start date back to the original and trace your connections. Some connections may be missing or some may be in the wrong direction.

16. Now, return the start event to its correct date. You are finished and ready to apply resources to the activities.

This is an overview of the basics of multiple-project and complex project design. If you need more help, four copies of the original VP documentation are available for reference in the division offices.

ACCEPT: Accept means that you are satisfied with the displayed form or table and desire it to be entered into VP's database. Accept is accomplished by pressing the minus (-) key. If you have a mouse, accept is accomplished by pressing both keys on a two-button mouse or the middle key on a three-button mouse.

ACTIVITY: A task or action which takes time (has duration) and uses resources (people, aircraft, money, etc.). Activities can be entered into VP only in the Network Planning Screen. Any of the following methods can be used to enter an activity:

a. Using the arrow keys move the cursor until you are on the desired row (by using the up/down arrow keys) and date (by using the left/right arrow keys). Use the + key to point to that location and get the activities menu. Highlight the activity by using the arrow keys and press + to select. Fill in the activity form and press the minus (-) key to accept the form. The activity will now be shown on the screen.

b. Using a mouse, move the cursor to the desired location for the activity (row and date). Press the left mouse button to point to the location. Move the mouse up/down to highlight the activity, and press the left button to select that option. Fill in the activity form and press both buttons (on a two-button mouse) or the middle button (on a three-button mouse) to accept the form.

c. Press the F9 key to get the Planning Menu. Select activity editor. From the editor tables, select activity schedule; then enter the activity names and durations from this table. To enter the descriptions, use the activity descriptions editor from the same menu. Likewise, you would select the activity codes editor from the same menu to enter all codes for the new activities.

ACTIVITY CODES: Activity codes are used to group activities and events together for summary data or for generating reports. Activity codes are assigned from either the activity form or the activity codes editor. An activity code can be up to 16 characters and assigned to any activity or event.

ACTIVITY EDITOR MENU: This menu is available while in the network planning screen. Press the F9 key to get the network menu. Then select activity editor. The activity editor menu allows you access to 4 different forms for entering information about activities. Sometimes it is easier to use these forms than to work through the network chart one activity at a time. To limit the activities viewed to those in the current network only, press the F4 (Local) key prior to selecting the menu. Otherwise,

you will see all the activities listed that are in your project file. You can sort the activities to make it easier to find a particular one by using the ALT-S combination. The following activity editors are available:

a. ACTIVITY CODES EDITOR: From this form, you can change or create activity codes to be used for organizing your project output for reporting. Up to three different codes can be assigned to each activity. Activity Code #3 allows you to set priorities your activities so that when you are leveling resources, the higher priority activities are rescheduled last.

b. ACTIVITY DESCRIPTIONS EDITOR: From this form, you can edit the descriptions of your activities to make them consistent or update them prior to printing a report.

c. ACTIVITY PROGRESS EDITOR: From this form, you can edit the progress you are making in accomplishing the activity. This includes entering the percentage complete and resource/expense used.

d. ACTIVITY SCHEDULE EDITOR: From this form, you can enter basic schedule information and add activities to the network chart. This includes entering the duration, name, target start/finish, and assigning resources/expenses to the activities. You can also make events on this form by entering 0 for the duration.

ACTIVITY FORM: The activity form is used for initially creating or modifying the information about an activity (or task). The activity form is available only on the network planning screen. Two methods are used to display the form:

a. You can create a new activity by moving the cursor to the desired row/date using either the arrow keys or the mouse, and pointing (the + key or left mouse button). The activity type menu will then display. Select activity, and the form will display.

b. To view the form for an activity already created, move the cursor until it is on the activity and point (the + key or the left mouse button). The activity form for that activity will display.

The activity form has various fields into which you can enter data about the activity.

NAME - This is the name you wish to give the activity. This name will be displayed on the planning screen. The maximum length of the activity name is 15 characters. Keep in mind that the relative length of the activity drawn on the screen is governed by its duration. If an activity has a duration of only

1 or 2 days, only 2 to 3 characters of the name will be displayed no matter how many you enter in this field.

DUR - This is the duration or total time you estimate the activity will take. It is important to place an accurate estimate in the duration so the model of your project will be accurate. The duration is in days and must be between 0 and 9999 days.

CODE - This is the activity code. This field may be left blank if desired. The activity code can consist of between 0 and 16 characters. This code is used to group information for reporting or when employing summary tasks.

DESC - This is the activity description and can be up to 50 characters long. Here, you can put sufficient details to understand what the activity is. This field is not displayed on the planning screen but is printed out when generating reports.

RES - If an activity is resource driven, the limiting resource name will be shown here. This is a computer-generated field and can not be changed by you.

CALENDAR - This allows you to specify a calendar for this activity. If no calendar is selected or shown, the default calendar will be used. You could have a special calendar (i.e., named WARTIME) that showed a seven-day-a-week work schedule and apply that calendar to this task. That way, some work would be done five days a week (using STANDARD) on routine tasks; but on critical tasks, you could estimate the overall project duration if work was accomplished all-out.

FLOAT - This is the extra time available (also known as slack) to accomplish this activity and still not cause any slippage in the overall project. If the activity is on the critical path, float will be 0. There are actually four different kinds of float which could be displayed. Total float is the default and is normally used. See FLOAT and CONFIGURE FORM for descriptions of the other types.

EARLY - This computer-generated field, which you cannot change, displays the early schedule for an activity. It basically tells you the earliest an activity can occur based on preceding activities starting early. This field will not initially be displayed.

LATE - This computer-generated field displays the late schedule for an activity. It is basically the opposite of the early schedule and shows the latest an activity can begin without causing project slippage. It is based on all preceding tasks beginning late.

The following border labels can also be activated to access other forms:

ACTIVITY - When you point to this label, the activity type menu comes up. This would allow you to change this activity to an event, summary task, or hammock.

PLAN/TRACK - Pointing to PLAN/TRACK changes the mode of the activity by toggling between the two labels. The mode displayed is the opposite of the one you are in; or, another way of looking at it is that the mode displayed is the one you will go to if you point to it. See PLAN and TRACK for detailed descriptions of the two modes.

RES DRIVEN/DUR DRIVEN - This label displays whether the activities' durations are caused by the estimated time you entered or by the duration of the resources which have been committed.

DELETE - Allows you to delete this activity. If you point to delete, VP will ask you to type Y or N to verify that you really want to delete this activity. Once deleted, the activity and all data (resources/expenses/connections) associated with it are also deleted.

UPDATE RESOURCES - When pointed to, this label allows you to access either the Planned Resource Form (plan mode) or the Progress Resource Form (track mode). Here, you update and assign all resources to the project and keep track of how much of the resource has been used.

UPDATE EXPENSES - When pointed to, this label allows you to get the Planned Expenses (plan mode) or Progress Expenses (track mode) Forms. Here, you update or assign any special expenses not associated with a resource (i.e., dollars to procure special equipment).

The following fields are available only in certain modes:

TARGET START - This is shown in the plan mode only. If you have selected "No" in the constraint field of the configure form (the default setting), this field is the date before which an activity can not begin. If you selected "Yes" in the constraint field, you will be given a list of constraints to choose from and then the desired date for the constraint. For more information, see CONSTRAINT and CONFIGURE FORM.

TARGET FINISH - This is shown in the plan mode only. If you selected "No" in the constraint field of the configure form (the default setting), this field is the date before which the activity must finish. If you selected "Yes" in the constraint field, you will be given a list of constraints to choose from and

then you would enter the desired date for the constraint. For more information, see CONSTRAINT and CONFIGURE FORM.

ACTUAL - This is shown in the track mode only and tells you the actual start and finish dates for the activity. If you enter an actual start date, it indicates that some type of work or effort is being expended on this activity. VP will allow you to enter the finish date only if the activity is 100% complete.

CMP - This is shown in the track mode only. It is the percent of the original duration that has been completed. If you make an entry here, the remaining duration field below is automatically calculated.

REM DUR - This is shown in the track mode only. It is the duration of work remaining to be done (remaining duration). If percent complete is entered above, this field is automatically calculated.

To accept the form after you have entered all the data you desire, press the minus (-) key or both mouse buttons. To reject the form (i.e., you do not want this activity after all), press the right mouse button or the Esc key.

AUTO MODE: In the auto mode, VP makes calculations and redraws the network after every change. To select auto mode, move the cursor over MANUAL on the network screen and point (press the plus (+) key or left mouse button). If AUTO is displayed, you are already in the automatic recalculation mode.

BUDGET CODES: A code which can be used to group resources together either for accounting or reporting purposes. Budget codes are assigned to resources at the time the resource is committed to a project. Budget codes are created and placed in the budget code table using the Budget Code Information form. To get this form on the Project Planning Screen, move the cursor until BUDGET is highlighted and point. In the form you can enter the actual budget code, a group code, and a description. The group code is used only for grouping the output on printed reports. The description is available simply as a memory aid as to what the budget code means. When you have finished with the form, press accept to place the codes into the database (minus key or both mouse buttons). To reject any changes you made, press Esc or the right-mouse button.

CALENDAR: Calendars are used to depict what days are workdays. VP allows you to have up to 10 different calendars in any one project file. This would be helpful if you had people working different workweeks on the same project. The STANDARD calendar has Saturday and Sunday shown as nonwork days. If you created your project from the BASIC template file, the STANDARD calendar also includes federal holidays. If you had people TDY who were

working 6 days a week, you would need to create a calendar that showed 6 workdays per week and then give it a special name. When you created an activity, you would then assign this special calendar to it, so the project's overall duration would be accurate. When viewing the calendar, three colors are used to denote different items. Black shows the calendar start date; red denotes holidays; and blue denotes workdays. To edit the calendars, you simply choose calendar from the main menu. Press the F9 key or the left-mouse button to get the calendar menu. You then have 4 choices:

a. EDIT DATES - This option allows you to change individual days from workdays to holidays. Simply use the arrow keys (or mouse) to move the cursor to the desired day and point. This will toggle the day between holiday and workday. When you have completed the editing, accept the calendar (- key or both mouse buttons).

b. EDIT RANGE - This option allows you to change the workweek over a specified period. In the FROM field, enter the date to begin the new workweek. In the TO field, enter the date to end the new workweek. Finally, you simply point to toggle the various days of the week to the desired value. Accept the form to enter the changes.

c. CALENDAR SPECS - This form allows you to redefine an entire calendar. You can enter a new name for the calendar (must be a valid DOS filename). You can set the days of the week to be holidays/workdays. Finally, you can set a start date for your calendar. The calendar can only be setup for the start date +10 years, so you should start it near the proposed start date of your project.

d. CREATE CALENDAR - This is the only way to create a totally new calendar that doesn't destroy the old calendar in memory. The fields and restrictions in this form are the same as in CALENDAR SPECS. The only difference is that this form creates a new calendar, and CALENDAR SPECS changes the current calendar.

CONFIGURE FORM: This form is entered by selecting CONFIGURE from the main menu. This can be used to change the default settings which VP uses for your projects. The following fields are available:

a. PROJECTS, REGIONS, RESOURCES, CODES, CALENDARS, REPORTS, IMPORT - These are the DOS paths which point to where you wish to save your projects, personal libraries of project templates, libraries of resources, budget codes, special calendars, reports, and imported documents. The default is the directories on the LAN. If you want your libraries on your PC hard drive, change these to C:\ and whatever subdirectory you wish to use.

Normally, you should just leave these on the default settings or management will be unable to find your projects for roll-ups.

b. PRINTER - This field shows the printer selected for the reports generated by VP. Point to the field to get the list of supported printers. Then move the cursor to highlight your choice. Press accept to use that printer definition. If you don't see your specific printer listed, you may have to experiment to find the compatible listing. Try the Standard 132 line printer for a dot matrix that may not be listed.

c. MONITOR - This field shows the type of display you desire. It is a toggle field so press point to toggle between COLOR and GREY-SCALE. If GREY-SCALE is selected, certain menu items will blink rather than change color.

d. FLOAT - Point to this field to get a list of available choices. Four types of floats can be specified:

(1) TOTAL = This gives the total allowable slippage which could occur in a given activity.

(2) FREE = This gives the amount of slippage that can occur without affecting any other activities.

(3) START = This shows how long an activity could be delayed from its early start schedule to its late start schedule before beginning work.

(4) FINISH = This shows how long an activity could be delayed from its early schedule to its late schedule before ending work.

When your activities are connected with simple finish-to-start connections, there is no difference between TOTAL, START, and FINISH floats. For normal ATTC projects, this should be left on TOTAL.

e. SCHEDULE - This is a toggle field between forward and backward which allows you to specify the type planning to be conducted by VP. Normally, you should leave this in forward. Forward means VP starts at your start event and shifts everything forward in time to plan the end date. Backward means VP takes the finish event, and backward plans by moving everything back in time to meet the finish date.

f. CONSTRAINTS - This is a toggle field between YES and NO. This should normally be left on NO. See CONSTRAINTS for a detailed description.

g. AUTO BACKUP - This is also a toggle field between YES and NO. If placed to YES, it automatically saves your old project

file as .BAK before overwriting it with your new project. This could be useful if you are changing a lot of resources through level and constrain operations which you are unsure of.

h. ENTRY DATE - This allows you to select the format of dates to enter. You can specify: 02/30/91 or 30Feb91 or 300291. The default is 02/30/91 (however, being military, I like 30Feb91).

i. DISPLAY DATE - This allows you to specify the format of the dates that are displayed. You have the same choices as above.

CONNECT: The CONNECT command is made from the network edit screen by pressing the minus key (or both mouse buttons) while the cursor is on an event or activity.

CONNECTION: In VP, CONNECTIONS are used to specify the logical flow of work in a project. All events and activities should be connected carefully in order to have VP accurately compute the critical path. Other words for connections in some management books are dependencies or paths. There are three types of connections in VP:

a. START-TO-START: This connection shows that two events/activities must start together. It is made by pressing the minus key (or both mouse buttons) to command connect while the cursor is over the left half of the first event/activity. You then move the cursor over the left half of the second event/activity and command connect. The connection form is then displayed. On this form you can specify any desired lag by typing the lag (in days). For example, if activity B can begin 10 days after event A, you would put the cursor over event A, press connect, put the cursor over the left half of activity B, press connect, type 10, and press accept.

b. FINISH-TO-START: This connection shows that one event must be completed before another can start. It is made by moving the cursor over the right half of the event/activity and pressing connect. Then move the cursor over the left half of the second event/activity, and press connect. When the connection form is displayed, enter the lag (if any) and press accept. For example, if activity E can only begin 5 days after activity D ends, you would place the cursor over the right half of activity D, press connect, place the cursor over the left half of activity E, press connect, type 5, and press accept.

c. FINISH-TO-FINISH: This connection shows that activities must end together. It is made by positioning the cursor over the right half of the first event/activity and pressing connect. Then move the cursor over the right half of the second event/activity and press connect. When the connection form is displayed, any lag can be entered and then the form accepted. For example, if 3 days of work must be done on activity G after

activity H is completed, you would place the cursor on the right half of activity H, press connect, place the cursor on the right half of activity G, press connect, type 3 in for lag, and accept.

The most commonly used connections in project planning are the START-TO-FINISH, and FINISH-TO-START connections with zero lag. If you attempt to make a circular connection, VP will warn you with a LOOP ERROR message and delete the last connection attempted.

CONSTRAIN: CONSTRAIN is a function used from the resource profile screen to reduce the level of resource commitment. When all resources from several projects are rolled-up, there will often be more resources committed to a project than are available. To constrain a resource, first obtain the resource profile screen for that resource. Press F9 to get the menu and select constrain. Then move the cursor to the date you want the constraint to begin (left/right arrows or mouse) and to the amount of the resource available (up/down arrows or mouse). Press connect to anchor each point. Simply move the cursor along and you will see the constraint line being drawn. If resource amounts change, press connect on the date of change, move the cursor to the new amount (vertically), press connect, and then continue along the dateline (horizontally). Press accept to enforce the constraint on your project. VP will automatically slip events/activities and reconfigure your project to meet the resource limits. This may alter the critical path and change the completion date of the project. If other resources are also critical, they will need to be checked for acceptability after the rescheduling. To check the effect of the CONSTRAINT, return to the project planning screen on the Network chart. All rescheduled events will be flashing and will have the symbol >>. You can reject or accept these changes by pointing to the word PENDING on the network screen. If you later change your mind, select UNDO from the menu which will undo all previous leveling/constraining (from this session). CONSTRAIN can also be used on the expense profile to depict cash-flow problems in the project.

CONSTRAINTS: These are time limits that you impose on your project. The default for VP is no constraints, which means that the standard CPM method of computing early/late schedules and start/finish dates are used. If you change the constraints to yes in the CONFIGURE FORM, you will have the option of applying more time constraints than just target start and target finish. Your choices will be Start Before, Start After, Start On, and Finish Before, Finish After. Start After and Finish Before should be used to duplicate Target Start/Target Finish. For non-complex projects, the constraints should be left in their default value.

COPY: In VP, COPY is used to duplicate a set of activities and events which may be repeated in your project. The copy function is available from the network planning screen. Copy allows you to save a duplicate of the desired region on the screen without changing the project. To copy a set of activities, first press F9 to get the menu and select Cut/Copy/Paste. Then from the Cut/Copy/Paste menu, select Copy-Paste. Now move the cursor to the upper-left corner of the region and point (using the + key or the left mouse button). Now move the cursor to the opposite corner (lower right) and point again. You need to be sure that the rectangle you define completely encloses the events and activities you want to copy. Now you have a choice. You can press the F8 key which will save this project to the library. From here, any time you have a similar project, you could use the F7 key to load a library and get an exact duplicate of this project loaded. As you can imagine, this will save you considerable time in planning similar projects. Your other option is to paste the copy into another region of the current project. Simply move the cursor to the location where you want the upper left corner of the region you copied, and point. You should see a duplicate of the previous region on the screen.

CRITICAL PATH: The CRITICAL PATH through your project is one which has no float (slack) time available. The activities and events on the critical path must be started and finished on schedule in order to meet the project completion date. If all events and activities are connected with simple finish-to-start connections, then all of the activities would be on the critical path. As soon as you have activities which can be done concurrently or you use other than finish-to-start connections, you will have both critical and noncritical paths. VP displays the critical path in red and the noncritical activities in blue.

CUT: CUT is similar to copy above. The main difference is that cut removes the selected region from the project and allows you to then paste it somewhere else. COPY also leaves the selected region in place, while allowing you to paste a copy of the region somewhere else.

DELETING: Deleting can be used to remove unwanted entries from a table or from the network.

a. The ALT-D combination deletes a line from a table. Simply highlight the line you want deleted and press ALT-D. If you make a mistake type ALT-U for undelete and the line will be restored. Once you exit from the table by accepting the form (- key or both mouse buttons), the deletions are permanent. If you totally have a table messed up, you can escape (Esc key or right mouse button) and exit the table without making any changes.

b. To delete an activity or event, move the cursor over the desired item on the network planning screen and point. Now move

the cursor until DELETE is highlighted and point again. Answer Y to the question and VP will delete that item.

c. To delete a connection, move the cursor to the initial item and press T (trace). The first connection from that item will be shown. Use the spacebar to toggle to the connection to be deleted and press F2 (Edit). The connection form will be shown. Highlight DELETE and point. The connection will be deleted.

DURATION: DURATION is the length of time that an activity will take to complete. By definition, all events (or milestones) have zero duration. The duration in VP is expressed in days and can be from 0-9999 days.

EDIT: The edit mode is activated by the F2 key. It is available in form fields and during the trace function of connections. It allows you to change the name of the network tree nodes and to make changes in the various forms.

ELASTIC: This is a type of resource allocation in which the amount of a resource projected to be used per day adjusts itself to meet the duration specified for the activity. (See FIXED). Elastic allocation is applicable in projects where the schedule is of ultimate importance and any amount of resources may be used to meet the required duration. Elastic allocation can be the default by setting that value in the Project Specs form in the toggle field Default Allocation. Otherwise, for each activity, the allocation method can be specified in the resource planning form by toggling the F/E field at the far right of the form. If all resources for an activity are elastic, the activity is duration driven.

EVENT: Events are milestones or goals for a project. They have no duration (or actually a duration of zero). Events can be of two types, Fixed or Floating. A fixed event is tied to a specific date. If that date slips, a line of shaded triangles (called a screech) will show the slip from the original date to the new date. A floating event is not tied to any date but can move freely based on how it is connected to other events and activities. Events can be created in several ways:

a. Move the cursor on the network planning screen to the row and date when the event should occur and point (left mouse button or + key). The activity type menu will appear. Then select Fixed or Floating Event. The Event form will then appear. Fill out the form as for the ACTIVITY FORM. Press Accept (both mouse buttons or the - key) to put the event on the network screen.

b. Press the F9 key to get the planning menu. Select Activity Editor to get the Activity menus. Select Activity Schedule Editor and fill out the form as for an activity except be sure to

place a zero in the duration field. You can enter several activities and events quickly by using this form.

You cannot assign resources or expenses to an event because it is simply a milestone or goal. If something in your project consumes resources or takes time to accomplish, it should be an activity.

EXACT MODE: The exact mode is entered from the network planning screen by pressing the F4 key. You will see the word EXACT on the status line of the network screen. To exit EXACT mode, press the F4 key again.

EXPENSES: Expenses are the dollar costs which VP uses to calculate overall expenditures and cost estimates for your project. The dollar cost for resources is automatically computed by VP based on the resource table information and level of commitment input by you. Other expenses not directly related to resources (i.e., rent, contracts, etc.) may be manually placed into VP. Expenses are entered in two primary ways:

a. From the Activity Form which you call up in the planning screen by pointing to an activity. Using this method, simply highlight the word Expenses on the border and point. You will automatically be placed in the Expense form.

b. From the Activity Schedule (or Progress) Editor Form which you call up from the planning screen by pressing F9 and then selecting Activity Editor from the menu. When in this form, move the cursor down until the activity you wish to enter expenses for is highlighted. Then move the cursor to the right until Exp is highlighted and point. You will then be placed in the Expense form.

In the Expense form, you will see the list of resources and budget codes along with the calculated costs for those resources. If you want to manually change the cost of a resource, move the cursor to the resource name and then move it horizontally until you are in the expense column, then type in the desired dollar amount. For example, you might have a UH-1 scheduled for a 2-hour ground test and the resource table shows that the UH-1 costs $500/hr. VP will automatically compute the expense for this activity as $1000. However, the aircraft won't really be flying, so we don't want to use any expenses for this activity. Then we would need to enter the Expense form and manually change the expense amount. Likewise, if we were going to charge this particular customer $650/hr instead of the standard rate, we would have to manually adjust the amount.

Pure expenses can also be entered, like rent for a hangar off-site. Just enter the Expense form and type rent in the resource name column, then space over to the expense column and type in

your costs. This combination of automatic and manual resource computation and special expense entry should give you the flexibility to accurately model your project and deliver good, verifiable cost estimates.

FIXED: This is a type of resource allocation where the distribution of the resource is over a fixed time period that will not vary with the projected duration of the activity. This is different from the elastic method which adjusts automatically to project duration. If any resource is assigned to an activity as a fixed resource, the activity becomes resource driven rather than duration driven. You would use this method aof allocation if a resource were available only for a specific period of time during the project. (See ELASTIC.)

FLOAT: Also known as slack, this is the extra time during an activity which will allow slippage without delaying the overall project. Activities in VP which have float are shown in blue. If an activity has 5 days of float, that means it can start up to 5 days later than what you had planned, and you will still be able to complete the project on schedule.

FORM: A form is simply a data entry screen. Various areas in the form are known as fields. Data can be entered into a form in several methods. A white field is a standard typing entry field. Use the arrow keys or the mouse to move the white field until it is beside the prompt you want. Then use the keyboard to type the information in. Use the Enter key to complete the entry. To accept the form and signal VP you are done, press accept. Remember, accept is the minus key or both mouse buttons. To reject the form, press Esc on the keyboard or the right mouse button.

The light blue fields are known as toggle fields. You can use the spacebar or + key (or left mouse button) to toggle between the choices available. Move the cursor with the mouse or arrow keys when the toggle field shows what you want.

The white fields with a blue arrow beside them are the choice fields. Here VP provides you a list of numerous choices to pick from. To activate a choice field, move the cursor to the field and point (+ key or left mouse button). The list will then pop up on the screen. You can then scroll through the list by using the up/down arrow keys or by moving the mouse in a vertical direction (either up or down). When the Item you want to select is highlighted, press point again (or Enter) and move to the next field. The keyboard can also be used to rapidly move around on a choice list. Home moves to the first item, End to the last item. Typing the first letter of a choice jumps you to that part of the list. Typing another letter, further narrows the choice. For example, if you type an H, the cursor will move to the first item

that begins with H. If you then type an I, the cursor will move to the first item that begins with HI.

HAMMOCK: HAMMOCK is an activity which is used to summarize a group of activities. To create a hammock, move the cursor to the approximate date of the first activity to be summarized. Press point. From the activity menu select HAMMOCK. Then fill in the form using the overall estimated duration and a description of the summarized activities. Press accept to accept the hammock form. To complete the summarization, connect the left side of the hammock to either the earliest event or the left side of the earliest activity in the group to be summarized. Then connect the right side of the hammock to either the latest event or the right side of the latest activity which is in the summarized group. The hammock should now grow or shrink to reflect the total duration of all connected activities.

LAG: A delay between the activities. The lag is noramlly entered from the connection form.

LEVEL: LEVEL is a function used from the profile screens. It allows you to level out resource or expense usage without changing the project end date. Because level will not allow project slippage, VP may be unable to level resources. In this case, you may have to use CONSTRAIN (described above). To level resources, you must be in the Resource Profile screen. Press F9 to get the menu and select LEVEL. Now move the cursor horizontally to the date you want to begin leveling. Then move the cursor vertically until it is at the amount of resource which represents the maximum level you want committed. Press point. Now move horizontally across the screen. The yellow dotted line will show the amount of resources desired. Press point to anchor the far end, the press accept. VP will now attempt to level out the resource usage. Remember, VP is using only this single resource, so even if it looks good, you may need to check other resources to ensure they have not been skewed by the calculation. If you don't like the result, press F9 and select UNDO from the menu. To accept the level and change your project to the new schedule, move the cursor over the word PENDING and press point.

LIBRARY: A library is a set of project parts which can be pasted into new projects to keep you from having to reinvent the wheel every time you get a new project. To put something into the library, go to the screen or form it is in. If it is a table or calendar, put it on the screen and press F8. Then answer the questions to put this into the library. To call something out of a library into your project, press F7. To put part of your project network diagram into the library, use the detailed procedures under CUT or COPY. Then instead of pasting it somewhere else in the project, press F8 to put it in the library.

Likewise, to paste a project template into your new project, enter the proper planning screen and press F7. Then select the desired template.

LOOP: A loop is an error caused when you try to make a connection that causes a circle. VP will beep and write LOOP ERROR in red to warn you of an illegal connection.

MANUAL MODE: When in the manual mode, VP suspends doing calculations with every change you make. This can be especially useful if you are modifying a large project or making many additions to a project. It can become very time-consuming to wait while VP makes an update every time you enter a piece of data. To change to the MANUAL mode, move the cursor over the word AUTO on the status line of the planning screen and press point. (See also AUTO MODE.) Anytime you make a change to a project and are in the manual mode, VP will display a red CALC on the command line. To perform a manual calculation, move the cursor over the word CALC and point.

NETWORK: A network is generally a group of activities/events which corresponds to a phase of a project. In our specific case, the total network (including all levels) is generally thought of as all tasks/activities/events related to a single XO code.

NETWORK LEVEL: The group of networks that are co-equal on the network tree. In the practical exercise, the top level was the highest part of the tree. The planning, testing, and reporting networks were all co-equal, but at a lower level than the top level.

NETWORK TREE: The network tree is the overall diagram of the major work (NETWORK EDIT) breakdown structure of a project. You get to the network tree display by pressing F5 while in the planning screen mode. To change the name of a network, use the arrow keys to highlight the box containing the network name and press F2. You will then be allowed to edit that name. To create a new network, use the shift-arrow key combination. To create a network at a lower level, use shift down arrow; to make a co-equal network, use shift left (or right) arrow. To enter a network and add events/activities to it, move the cursor until the network name is highlighted, then point. To move repeatedly between two networks, enter the first network normally, then press F5 and enter the second network. Now the F6 key will switch you back and forth between the two networks.

For multiple-project use, VP will import multiple projects into the network tree. Position the cursor on the network which is of an equal or higher position in the tree. Press the F7 key. Now select the name of the project you wish to import. VP will ask you to press down/left/or right arrow which will tell it where to place this project on the tree.

PENDING: The pending label will be displayed in the top center of the network planning screen whenever you have done a level or constrain operation. Once you have examined the new project schedule, you can point to the word PENDING and VP will ask whether you want to accept the new operation. If you do, answer Y; otherwise the projects will be returned to the original schedule.

PLAN: When PLAN is displayed at the top of the network edit screen, it means you are in the TRACK mode. To enter the plan mode, move the cursor over the word PLAN and point. The plan mode allows you to enter projected resource usage and events, while the track mode allows you to expend the resources for project accomplishment. For initial project planning, the word TRACK should be showing.

PROGRESS FORM: This form is used when you are about to begin tracking the execution of your project. You enter the progress form by selecting Post Progress from the network menu (pressing F9). There are four fields in this form:

Current Status Date - This displays the current status date for your project. This is the date where the vertical dashed line is drawn through your project when you enter the TRACK mode.

Proposed Status Date - This displays the new date at which you will status your project. This is the date where the dotted line will be drawn vertically through your project.

Accept the New Status Date - This causes the proposed status date to become the current status date. Activities and events in your project will now be adjusted based on completion. No uncompleted work can appear to the left of the dashed line.

Reinstate Last Status Date - If you forgot to update some progress, you can always undo the adjustment of the events/activities by reinstating the old date. VP will then readjust the schedule back to the way it was.

[Date] - The date in brackets at the bottom of the form cannot be changed by you. It is the last status date, i.e., the one that will be used if you choose Reinstate Last Status Date.

PROJECT SPECIFICATION FORM: The project specification form is where you customize VP for the particular project you are working on. It has several fields which control project information:

File Name - This is the default filename for the project which must be a valid MSDOS name. Remember to always update this field first when you are starting a project to avoid destroying the BASIC template file.

Description - This field allows the entry of up to 50 characters to describe your project. This is displayed along with the file name whenever you try to load the project in order to remind you what the project is.

Project Start - This allows you to specify a project start date. Entering a date in this field is optional and is not required for accurate tracking.

Project Finish - This allows you to specify a project finish date. Like Start, it is an optional field.

Imposed Start - This field can be used to declare a date before which no event/activity can take place. This is an optional field.

Imposed Finish - Use this field to specify a date after which no activity can occur. This too is an optional field.

Split Activities - This toggle field allows you to select yes/no which enables activity splitting. See SPLITTING for more details.

Activity Count - Simply gives you the total number of activites and events that you have created in a project.

Subnetwork Count - Displays the number of isolated sub-networks in a project.

Default Calendar - Allows you to specify a default calendar for use with each created activity. It is normally set to STANDARD. Whatever this field reads will be the automatic calendar used with each activity created. Remember that you can override this automatic choice by manually selecting a calendar name when you create an activity.

Default Summary Field - This field will automatically be used to summarize activities/events when you create a Summary Task. It is set to Act Code 1 by default. There are actually three different codes (1,2, and 3) that can be used to summarize information. (See SUMMARY TASKS).

Default Allocation Type - This specifies either ELASTIC or FIXED resource allocation will be used. For any activity, the default can be overridden by pointing at the F or E showing on the planned resources form.

Resources - Pointing to the word Resources on the border will bring up the resource table. All resources to be used in a project will be listed here. Additionally, you can update the Resources available by adding new resource names at the end of

the list. The actual aircraft tail numbers and personnel names are listed in the resource table in the BASIC file.

Act-Code 1 Definition - Pointing to this label will allow you to edit the activity code 1 definition by bit field. Use of this option is not really usefull to ATTC projects.

Budget Codes - Pointing to this label will place you in the Budget Code field. The budget codes contain the aircraft and pilot types for accurate representation of resources and expenses.

RESOURCE: A resource is something that must be applied to an activity in order to complete it. Resources are assigned to activities as you make your initial project plan. Resources to be used must already be in the resource table prior to their assignment to an activity. Resources can be placed in the table by using the project specs form (see PROJECT SPECIFICATIONS). Resources are entered in two ways: by pointing to the word Resources on the border of the activity form (the form that appears when you create an activity) or from the activity schedule form by pointing at the word RES. The resource usage form will appear. Information can then be entered as follows:

Resource Name - Allows you to select the resource to be assigned using the list available from the resources table. You can scroll through the list using the arrow keys, or type the first few letters to go rapidly to a part of the list. Home will take you to the top of the list, while end will take you to the end of the list. Press point (or enter) to select the desired entry.

Code - This field allows you to pick the desired budget code from the budget code list. The same procedure as above is used to select the desired code.

Plan - The total planned quantity of work that this resource should expend to work on this activity. For ATTC projects, this will be expressed in hours. If you are using fixed resources, pointing at this field will give you a distribution subform. This subform allows you to specify a different rate for the resource over the time available.

Rate - This allows you to specify the rate of usage of the resource for the project in units/day. For fixed resources the Plan divided by the Rate will give the duration of resource of usage, and will modify the duration of project (make it resource driven). For elastic resources, the rate times the project duration gives the Plan (duration driven).

Dur - The duration of the resource. For elastic resources, the duration = activity duration and can't be changed. For fixed

resources, (if you haven't specified a distribution on the subform) you can enter the length of time the resource will be available.

F/E - This is a toggle field which represents the type of resource (fixed or elastic) use. This field will initially show the default setting (see PROJECT SPECIFICATIONS). Pointing to the letter will change the resource use to the other type. See FIXED and ELASTIC for more details.

The resource usage once a project is underway is updated two ways. When in TRACK mode, point at Resources on the activity form border (which you get by pointing at an activity on the planning screen) or point at the word Res in the activity progress form (which you get by pressing F9 in the planning screen and selecting Activity Editor and then Activity Progress). The following fields are available:

Resource Name - VP displays the names of the resources that you have planned for here.

Code - VP displays the budget code associated with the resource name here.

Actual - The actual amount of work completed by the resource can be entered here. If you wish to enter percent complete and have VP compute actual/remaining resource rates, skip over this field. If you make an entry here, VP will automatically compute percent remaining, based on the actual/remaining entries you make. If you enter something here initially, then decide you would rather enter Percent Complete, press ALT-D to delete the entry in this field.

Remaining - This field displays the quantity of work still to be done. As with Actual, an entry here will cause VP to compute Percent Complete based on actual/remaining hours. If you decide you want to enter Percent Complete yourself, and accidentally make an entry in this field, press ALT-D as above.

CMP - This field displays the percent complete of the resource usage for the activity. It is computed automatically if you enter figures in the actual or remaining fields. If you skip actual/remaining and come directly to CMP, VP will allow you to enter the percent complete, and it will used the Planned resource usage to compute actual and remaining.

SAVE: Pointing to the word SAVE at the top of the screen will allow you to save your project to the LAN or to your PC. When you point to SAVE, you will get a screen that allows you to enter the filename for this project. To save the project to the LAN, type the filename you want for your project. This is the name that will appear when you try to load the project back in, so you

should choose something meaningful to both yourself and your boss. VP will automatically have entered the filename you specified on the Project Specs form (see PROJECT SPECIFICATIONS). To accept that filename press accept (minus key). VP will then save your project. If there is already a project by that name on the disk, VP will ask you if you want to overwrite the file. If this is a brand new project and you have never saved it before, DO NOT answer yes. Otherwise you will wipe out your buddy's project and all his hard work. If you have saved this project under this filename before, then it is okay to overwrite your old information with new information. To save your project on your PC, type c:\ in front of the filename to specify you want it on your hard drive. Remember though, projects on your hard drive, while safe from your fellow project officers, are also not available to your boss. Only those projects saved on the LAN are accessible by management. To load a project that you have saved on your hard drive, you must enter the Configure Form, and change the word PROJECTS in the first field to C:\.

SAVE will be green when you first enter VP. This shows that no changes have been made. When SAVE turns red, it means you have made changes which should be saved or they will be lost.

SUMMARY TASK: A summary task allows you to summarize a group of activities and events to get the big picture of a project. A summary task is created the same way as an activity. Point to the date to start the summary and select SUMMARY TASK from the menu. The following fields will be available:

Name - A 1-15 character name of the task that will be displayed on the screen.

Desc - A 1-50 character description of the task.

Dur - An initial duration. It really doesn't matter what you enter here since the summary's duration will be computed based on the activities/events which you are summarizing.

Code - This is the code that will be summarized. For each event/activity to be summarized, you should have entered some part of the code in their code field as unique. For example, everything associated with writing (test plans, reports, etc.) has been given the code of 123 as the 2d, 3d, and 4th characters in their code field. To summarize all writing tasks, you would enter ?123* in the summary task code field. Remember that ? is a wildcard that matches any single character, while * matches any number of characters. If we summarized on *123*, then any activity/event that had the sequence 123 would be included, not just those with 123 in positions 2,3, and 4 of the code. By planning how to set up your codes, you can create complex summaries of several different areas.

Calendar - This is the calendar used to compute the duration of the task.

Summary Field - This indicates what code field will be used to summarize the task. Activity Code 1 is the default and should normally be used.

Float - This field displays the float available in the summary.

Early - This field displays the early schedule of the summary.

Late - This field displays the late schedule of the summary.

Delete - Pointing to this label will delete the summary task.

Summary Task - Pointing to this will allow you to change the summary to an event, activity, or hammock.

Track/Plan - Allows you to switch between the PLAN and TRACK mode for this task. When initially creating the summary task, you are in the PLAN mode. When in TRACK mode, the following three fields are displayed:

Actual - The actual start/finish of the summary.

CMP - The percent complete of the summary task.
Rem Dur - The remaining duration of the summary task.

TIME SCALE: The time scale is displayed on the bottom of the planning screen. To change the scale, you press the F3 key and either the left or right arrow keys simultaneously. This will contract (left arrow) or expand (right arrow) the scale. You can display one week or several years across the bottom of the screen at once. The more the scale is contracted, the more likely it is you will have to enter the EXACT mode to get the specific day you desire.

TRACE: The trace function is available to trace connections or resource/expense usage. To trace connections, move the cursor to the event or activity which you wish to trace from and push the t key. The first connection will be displayed in the top center center of the screen. To view the next connection, press the spacebar.

To trace resource usage, get a resource profile of the resource you want. Then place the cursor on the date you want to view and press t. The center of the screen will now show the activity associated with that resource, and the resource profile will be highlighted to show the relative percentage of that activity's use. Press the spacebar to look at the next activity's use.

To trace expense usage, get an expense profile of the resource you want to view. Then use the same procedure that you used with resource above to trace an activity's resource usage.

TRACK: The track mode allows you to display the progress that you have made on the project. To globally change to the track mode, point to the word TRACK on the top left of the screen. (You can also change an individual activity to TRACK by pointing to Track on its border). By entering the track mode, you can display and enter resource/expenditure usage information and post progress to the project. Based on information in the PROGRESS FORM, VP will reschedule events/activities based upon actual progress as opposed to the original plan.

WILDCARD: A wildcard is a symbol used to match any other symbol. In VP the * matches any number of characters while the ? matches only one. For example ? matches a or b or 1 or 5 or ^, but not aa, ab, 54, or &). On the other hand, * matches a or aa or aaa or adsfert or re342$@oip. Wildcards can be placed anywhere in a symbol. For example, to match anything that begins with a, use a*. To match anything that ends in a, use *a. To match a two-letter code that begins with a, use a?.

CHAPTER 5. VIEWPOINT PROJECT MANAGEMENT PE

This is a demonstration guide and practical exercise to using ViewPoint in the planning, executing, tracking, and reporting of a project.

As you are instructed to compare screens in the reference manual to screens on the computer during this PE, you will note that they are not exact matches. The field names will represent those things you have typed in and the dates and timelines will be different; however, they are similar enough for you to verify that you are in the proper part of the program to continue the PE.

Practical Exercise, Part 1

To enter ViewPoint, simply select option G from the ATTC Applications Menu.

The first screen you see will look like the one in figure 1. This is called the Version Screen. It is helpful because it also tells you the function of the special keys. Anytime you want to see this screen during a ViewPoint session, simply use ALT-V. (Hold down the Alt key while pressing the V key.)

Throughout the practical exercise text, we will refer to the plus key (point key), the minus key (accept/connect key), and the Esc key (escape key). If you have a mouse you can subsitute left button for + key, right button for Esc key and both buttons for - key. Also, anytime using the arrow keys is mentioned, you can substitute moving the mouse.

The program will automatically move to the next screen as shown in figure 2. This is the program's main menu. From this menu you select the major section of the program that you want to perform. Use the up arrow/down arrow keys to cycle through your list of options. You will notice a short description of each function listed in the upper center of the screen. For a more detailed description of the function, you can use the F1 key which is the HELP key. This key will give you context-sensitive help on the function you are trying to perform.

To select a menu item, you use the + key (or left mouse button). This is known as pointing. Pressing the minus key is known as connecting or accepting. If you use ALT-V now you will see the version screen. Note on the right side it shows the point and connect keys in case you forget which is which. The picture in the center is for a mouse. If you are using a mouse, the buttons provide the connect and point functions. Press any key to make the version screen go away.

Now highlight the Files option on the main menu. Press the + key (point) and you should see the screen shown in figure 3. Now select the open function (by pointing). You will now see a list of files which are stored in ViewPoint. We need to build a new project for this PE. The file BUILD has a standard calendar with no holidays and no resources. You would select BUILD if you wanted to start a project completely from scratch. The file BASIC has the normal ATTC resources and the calendar shows the standard military holidays. For beginning a normal project, select BASIC using the arrow keys and the plus key. If you received an error message stating no projects were found, select main menu. Then select Configure. The first highlighted field should contain only the word PROJECTS. If it doesn't, type PROJECTS in this field, then accept the form (minus key). Now start this paragraph over.

You are then asked to verify this is the project you want to load. The screen you are looking at (similar to figure 4) has a shaded field that has the words Read Only or Read/Write. Use the + key to toggle between your choices. Read Only allows someone to view your project but prevents them from accidentally writing over it. Read/Write allows full access to the file and allows the person viewing the project to overwrite the file on disk. Press the plus key until Read Only is showing and then press the minus key to accept the screen.

The project will now be loaded into memory. You will be looking at the network edit screen similar to the one in figure 5. Now press the F9 key. This key is the menu key and will display the appropriate menu based on where you are in the program. Now use the arrow keys to highlight Main Menu and press the plus key.

Now use the arrow keys to highlight Project Specs. Select this entry with the plus key. You should now see a screen similar to figure 6. Press the arrow keys and you will notice that a different field is highlighted with each press. Press the arrow keys until the field beside File Name: is highlighted. This is where you name your file. Any legal DOS filename can be placed here, but I would suggest something meaningful to both you and management, i.e., XO332 or CH-47 LTF. After you have named the file, press the down arrow once and put in a detailed description of your project. This will help jog your memory if the filename also is not descriptive of the project.

Now press the arrow keys until the word Resources on the border is highlighted. Press the plus key to select this item. You are now looking at the resource screen (figure 11). The resources are in no particular order. To alphabetize the list so it will be easier to review, press the alternate key and S key together. This selects the sort option. Now you can specify the criteria you wish to sort by. Press the plus key to see the available choices. Highlight Resource Name and press plus again. Then

press minus to accept the form. After a few seconds, the sorted table will be visible. You can scroll through the resources by using the up/down arrow keys. Every resource which you want to keep track of during your project needs to be in this table. The table you see is a basic table containing personnel and aircraft assigned to ATTC. Press the END key You are now at the last entry of the resource table. If there was a special resource you wanted to track you can now enter it in the table. The main things to enter are the resource name and the expense rate/unit. The group and description are useful in preparing reports, but are not fully necessary when simply tracking projects. To enter a new resource, space down below the last entry in the table and simply type the data in using the normal keys. Use ENTER to go to the next input field. To accept the resource screen with any additions you have made press accept (the minus key). To throw out all changes made in this session, use escape (the Esc key). The program will ask you to verify that you don't want to save the changes. Press Y or N as appropriate.

Use the arrow key to highlight Budget Codes. Press the plus key to accept this screen. Budget Codes are used to allow groupings of resources to be plotted for more accurate information. Again you can use ALT-S to sort the table alphabetically by using the same procedure as above. The codes you are looking at allow a many-to-one or a one-to-many relationship to be achieved. As an example, when you assign a resource like Sobey to a project, you should also assign the budget code AH-64 PI or UH-60 PI or Engineer or whatever function that resource will be performing. This will become a little clearer later on. You can enter additional budget codes just as you may have entered additional resources. Press the minus key to accept the budget screen or the ESC key to reject any changes you made.

You should now be back in the basic Project Specs screen. Press accept (minus key) to get the main menu. We are now going to begin actually planning a project. Select the Planning Scrn by highlighting its name and pressing the plus key. You should now be in the Network Edit screen similar to figure 5. In the center of the screen you will see a white crosshair. You can move this around with either a mouse or the arrow keys. Press the right arrow and hold it down. Note that the date in the upper right hand corner is changing. Now press the up and down arrows. Note that the row number is changing. Your primary project milestones should always be located on row 1. Move the crosshairs to row 1.

Now that you can get around the network edit screen, let's look at the overall project design. Press the F5 key. This is the GOTO key and basically allows you to go to the Network Tree from the Network Edit screen. You should see a box labeled TOP LEVEL. This is the top of the tree where the executive managers (division chiefs and commanders) can rollup all the resources that ATTC as a whole is using. As you design your project, the

tree will assist you in isolating the resource expenditures during various phases of the project. To create your own tree, use the SHIFT key in conjunction with the appropriate arrow key. Some keyboards don't recognize the dedicated arrow keys. Press the down arrow while holding down the Shift key. You should see a box asking you for a network name. If nothing happens, you must use the arrow keys on the numeric keypad. Disable NUMLOCK by pressing the Num Lock key if it is on. Then try the Shift key-Down arrow (on the numeric pad) again.

You are now looking at the Network Name Box. The level below the Top Level is used to roll-up the XO codes resources into one total, so type XO and the number of your project. For this PE use any code, i.e., XO 123. Press ENTER when you are done. The levels below the XO code are to group similar tasks together based on WHAT is being done rather than WHO is doing it. For complex projects, you may need to contact MAJ Waters or Larry Wise for personal help in design of the tree so it follows good top-down structured design. For most small tests at ATTC, the next level consists of three phases: Planning, Testing, and Reporting. Let's create those levels now.

Use the Shift Down Arrow combination to get to the next level down in the tree. Name this level Planning (type Planning and press ENTER). We are now going to use the Shift and right arrow to create a co-equal phase called Testing. Then use the Shift and right arrow again to create Reporting.

The arrow keys alone can be used to move around the network tree. Use the Up arrow to move back up to the Top Level. Now press the plus key. You are now in the network edit screen. Here, you are able to enter activities and events at a high level that might impact on your test, but that are not directly part of the test. For example, Leaves, Schools, etc., might be shown here to block out individuals from being available as resources lower in the tree. Now look in the upper left corner. You can see your project filename and below that the level of the tree that you are working in (Top Level). Now press the F5 key. You are back to the network tree. Again, use the arrow keys to move around in the tree. Move down to the Testing Phase. Press the plus key. The upper left corner of the Network Edit screen should show Testing.

All projects have a TRMS 440 start test event. For this session we will begin the project plan with event 440. Now move the crosshairs to the start date of the project. For this PE, use 1 May 91. Use the right arrow key to move to future dates and the left arrow key to move to the past. The date you are at now is in the upper right hand corner.

It is possible to change the time scale at the bottom of the screen. The scale will move progressively from weeks to months

to quarters to years. Use the F3 key to change the scale. Press the F3 key and the left arrow key once at the same time. The scale should contract (i.e., go from weeks toward months). Don't be alarmed if you hear a beep. Just release the keys and try to press them for a shorter time. As you press the left arrow more and more times, the scale contracts more and more. Hold down the F3 key and press the right arrow. The scale should expand (ie go from months toward weeks). Use the combination of F3 and arrow keys to set a scale appropriate for the project. For this PE adjust the scale until "May 1991" is showing over 2/3 of the bottom screen.

You should now have the desired scale set on the bottom of the screen, you should be in the Testing Phase, Row 1, and the date of your project start should be in the upper right corner of the screen.

Press the plus key to point to that date. You should get the Activity Type menu similar to figure 7. Since event 440 is an event, select Floating Event from the menu. Highlight Floating Event with the arrow keys and press plus. (A Fixed Event should only be used if there can be no slippage and the event must happen on that day. Refer to the Technical Reference chapter under Event for more details.)

You should now be looking at the Event Form shown in figure 8. Name the event 440 by typing 440 in the Name field. Use the down arrow to move to the Desc field. We will skip the code field for now. Type a detailed description of the event: i.e., Begin AH-64 LTF flight program. If there is a change in the date of the event later, you can put a target date in the form and the event will automatically be moved. Press the minus key to accept this form.

The network edit screen should now show a small v with 440 over it. Now move the crosshairs to the projected end date of the test. Make another event labelled 550 in the same way. For this PE, use 7 Jun 91 as the projected end date.

Now we are ready to do the most difficult part--to put in those activities we have to accomplish between starting the test and ending the test. For this example, we will assume there is a Human Factors Evaluation, a short ground test, and a flight test.

Move the cursor to the start date of the test again and put it on Row 2. Point to the date with the plus key. You should be looking at the activity type menu again (figure 7). Now select activity from the list. The activity form (figure 9) should appear in front of you. The first activity we will enter will be the HFE so type HFE in the Name field. Press the enter key to go to the next field which is Dur. Here you must estimate the duration of this activity. Let's assume you are allowing 5 days

so enter a 5. Press the enter key until you are at the desc field. Here type a description of the activity. This is all we will do with this activity for now so press the minus key to accept this form. You should now see an activity named HFE extending for 5 days across the screen.

Move the cursor down to row 3 and use the plus key and menu to make another activity called Gnd Tst. We will estimate that this will take approximately 5 days also. Move the cursor to row 4 and make another activity called flight test. We will estimate that this will take 15 days.

Now we have the events and activities which make up the testing phase of the project. The next step is to link these all together to show any dependencies between events and activities.

Of course, the start event is the first thing that must happen. Let's asssume that that the HFE eval must occur first, followed by the ground test. The flight test can start after 2 days of ground testing has been completed. And finally, event 550 occurs after all testing is completed.

Move the crosshairs until they are over the triangle for event 440. Now press the minus key. The top center of the screen should now show that you are in the CONNECT mode. Move the crosshairs over the left part of the HFE activity and press the minus key again. You should now see the connection form similar to figure 10. Since HFE must occur first before anything else, we simply press the minus key to accept the form with no further input.

Now move the crosshairs over the right end of the HFE activity and press minus again. We are assuming for this project that ground testing can only start after the HFE has been completed. Now move the crosshair over the left side of the Gnd Tst activity and press minus again. The connection form will appear once again. Notice that this is a Finish-to-Start connection, i.e., HFE must be totally finished before the ground test can be completed. Press minus to accept this form.

Now move the crosshair over the left side of Gnd Tst and press the minus key. Move the crosshair over the left side of flight test and press the minus key. Now look at the connection form. Note that this is a start-to-start connection. If we accept the form the way it is, we are saying these events can start together. In our assumptions for this project, we said that flight test could start 2 days after the ground test started. Note that the field Lag: is highlighted. This is where we could note that there is some delay between events. Now type 2 and then press the minus key to accept the form. Now finally, we must show the end of the project coming together at event 550. Press the minus key on the right end of flight test and connect

it to the 550 event. Likewise, connect the ends of ground test and HFE to event 550. Now the program knows that event 550 cannot occur until all tests are complete. Note that the sequence of selecting events and activities is important. A connection from event 550 to flight test is not the same as a connection from flight test to event 550.

We now have a workable model of our project. If you look at the diagram, you will see some activities are blue and some are red. The path that traces through the red activities is the critical path through your project. These are the activities that must occur as scheduled if the project is to be completed on time. The blue activities have slack time available and can slip somewhat and you can still complete on time. The amount of slack time available is shown by a hollow blue box in the background.

Now it is time to assign resources to the activities that we have shown.

Move the crosshair over the HFE activity and press the plus key. You should now see the Activity Form. Highlight resources by using the arrow keys and then press plus. You should now see the resource usage form similar to figure 12. The first thing you will notice is that the name field is highlighted with a blue arrow beside it. This is ViewPoint's way of telling you there are multiple entries which are automatically available. Now press the plus key. You should see a list beside the field. Press the END key and ViewPoint takes you to the end of the list. Press HOME and ViewPoint returns you to the top of the list. The arrow keys will move you up and down through the list. To rapidly go to a specific resource you can type the first letters. For example, type an S. You are now down the resource list to the first S. If you type a T, you will move to the first resource that begins with ST. Press ENTER to accept the resource you want. For our demonstration, type HOME and then E and select ESSEX. The highlighted field will move to the right to the budget field. Now select Contract. The cursor should now be in the plan column. There are two ways you can allocate resources in this basic demo. The first is to put the total hours Essex will work into this column, i.e., enter 35. VP will now calculate the rate based upon the duration which you already entered. The second way is to enter the rate, i.e., assign Essex to work 4.0 hours per day. You can do this by using the arrow key to skip over the plan column and leave it blank, and then entering 4.0 in the rate column. We can continue on each line to enter the resources necessary for this activity. Let's assume the test is for UH-1, SN 66-17080. We will further assume the aircraft can only be used for this test and cannot be flown or used by anyone else until the HFE is finished. Again under resource name, select 66-17080 the same way you selected Essex. Now for the budget code, select UH-1 AC to show it is an aircraft. In order to block out the aircraft from use we need to

put in a rate of 24 in order to obligate the aircraft for a full day (24 hours) each day of the HFE. Now press the minus key to accept this form. Press minus again to leave the activity form.

Now move the crosshairs to the Gnd Tst activity and press the plus key. Highlight resources and use the plus key to get the resource screen. Again, we need to select the aircraft as part of the ground test but we only need it for half a normal workday. Select the aircraft tail number and budget code the same way you did above. In the rate column put 4.0 to show 4 hours per day. This means the aircraft will show as available for the second half of the day. Let's assume Essex will work a total of 10 hours during the ground test so enter them just as above. Finally, we need to allocate a pilot, so select MAJ Waters from the resource list. Under budget code select UH-1 PI to show he is the pilot and have him work 4 hours per day also. We will also have an engineer, so select Mr. Caskey and have him work 4 hours per day. Press the minus key to accept this form and minus again to leave the activity form.

Now move the crosshair to the Flight Test activity. Select this activity (by pointing) and select resources as before. Assign the aircraft to fly 40 hours during the test. Assign the pilot and engineer to work 70 hours on the test during this activity. Don't forget to use the same pilot, engineer, and tail number that were used above.

We have now completed Phase I of the PE. At this point you should save your work. Move the cursor over the word SAVE at the top center of the network edit screen. Point to the command (press = or left mouse button). You will get the save form. Assign a filename to the PE. If you want to save it to your PC, type C:\ and then the filename, i.e., C:\MYVPPE. Then press accept (minus key or both mouse keys) to accept the form. To save it on the network where it will be easier to access, type the filename alone and press accept. When you are entering real projects, it is smart to save your project both on the network (so management can find it) and on the C: drive on your own PC. That way if one of your fellow project officers accidentally chooses the same filename for his project as you were using, he won't destroy your work when he saves his project.

If you decide to take a break now, you can exit VP and start up again the same way as above except instead of choosing BASIC from the files list, you would choose your own filename.

Practical Exercise, Part 2

Welcome back to phase 2 of the VP PE. If you took a break after phase 1, load your project just like you did at the start of the PE; except, remember to use the name of the project you saved for phase 1 and not BASIC. After loading the project, you should automatically be in the network edit screen. If you are in the top level (upper left-corner), then press F5 and move down to the testing phase of your project. Point to enter the testing phase edit screen. (Remember point is the plus key or left mouse button.)

We are now ready to take an overall look at the project resources. Press the F9 key and select CHANGE DISPLAY from the menu. Now select RESOURCE PROFILE from the menu. Let's look at MAJ Waters first; so, select him as the resource. You should now get a graph of the resource utilization with hours on the vertical scale and time across the horizontal scale. If you look in the upper-left corner, you will see the resource and budget code identified. It is currently on Waters and ANYCODE. Move the cursor onto the words ANYCODE. Now, point (press the plus key). The available budget codes will be shown. Select ENGINEER. The graph now shows there are no requirements for MAJ Waters as an engineer. Select UH-1 PI on the budget codes. Now, you can see the requirements for him as a UH-1 pilot.

If we assume that we will work only 8 hours a day, then there is a problem. MAJ Waters is being shown more than 8 hours for a period of time. We can use two methods to attempt to schedule the project activities so that MAJ Waters doesn't have to work any overtime. Hit the F9 key to get the menu and note that there are two options called LEVEL and CONSTRAIN. LEVEL attempts to make the activities meet requirements without changing the project end date. LEVEL may do nothing if there is no slack time in any of your activities. CONSTRAIN, on the other hand, will reschedule all activities necessary to meet the resource limits you have imposed. The project end date will slip if there is not enough slack time available.

So let's look at both examples. First, point to level. Now, move the crosshairs left of 1 May 91 and put them vertically at 8 hours. Then, press the plus key to anchor the left of the constraint line. Hold down the right arrow key and draw the constraint line at 8 hours across the upper portion of the graph. At the right side of the graph, press the plus key again to anchor the line. VP will now attempt to adjust the project schedule to meet the leveling requirements of the system. You can see the resources have been shifted to meet the constraints. Now, press F9 and get the menu. Select CHANGE DISPLAY and select NETWORK CHART. Now, you can see the slippage of your activities and events. Small arrows (>> <<) will be shown on activities that have changed, and a line of v's (vvvv) will show the

slippage of events (called screech!). If VP beeps and shows an ERROR message, it means that there is no slack time available for leveling and you will have to use CONSTRAIN.

Press F9 to bring up the menu and select UNDO. VP will ask you if you want to remove the constraint; so, type Y. Now, all the tasks are back to their original times. This step is not necessary if you got an error message during the level operation.

Follow the same procedure for CONSTRAIN. Press F9 to get the menu and point to CONSTRAIN. Use the same procedure to draw a constraint line at 8 hours for MAJ Waters. Now, you should be able to see some difference in the project schedule from what level caused. Obviously, this simplistic example is not very useful; but if you were the division chief rolling up all AH-64 pilots and trying to level multiple projects, LEVEL and CONSTRAIN could come in handy.

One note of caution. VP only allows you to LEVEL/CONSTRAIN one resource at a time. Because of this, other resources which were OK prior to the LEVEL/CONSTRAIN operation may be skewed after the leveling of some other resources. Thus, ALWAYS check through the project schedule and resource profiles of all critical resources prior to accepting a level/constrain operation. Remember, pointing to UNDO on the main menu will allow you to go back where you started from; so, don't panic if everything looks screwed up! If you like what you see, point to the word PENDING on the network edit screen and the project will be changed forever to the new leveled/constrained schedule.

Now let's look at expenses. In VP, a method we can tie dollars to resources and produce cost reports and estimates is called EXPENSES. Move the cursor over the words RESOURCE PROFILE and point. From the menu, select NETWORK CHART. Move the cursor over the flight test activity and point. Now, select EXPENSES and point again. You are now in the expense form. You can see VP automatically enters expenses related directly to resources and computes them for you. Let's suppose that you have a rental contract for a hangar that is $3,000. Simply press ENTER (or down arrow or pull the mouse down) to space to the first blank line in the expense form. Now, type Rent in the resource name column; and put 3000 in the plan column. Now accept (minus key) the form.

We can also manually adjust expenses to reflect real world conditions. Point to the HFE activity. Then highlight expenses and point. Note that the 24-hr/day Huey is being charged at flying-hour rates. This is not accurate because the aircraft is just setting on the ground. Use the arrow keys to get into the dollar column and change the amount to zero. Now, your cost estimate produced by VP will be accurate.

Now press F9 and select expense profile. Select ANY RESOURCE/ANY CODE to get the total expense estimate for your project. As you look at the graph, you can the rate of expense use through the life of the project. To see cumulative totals, move the cursor just above the top of the expenditure line and point. That number is the total dollars used to that point. To get a project estimate, move the cursor to the far right of the graph (about 6 Jun 91) and point. That is the total dollars that VP has calculated for your project based on the resources and special expenses used.

By using various combinations of resource name and budget code, you can get general or very specific expense (or resource) profiles. For example, by using "any resource" and "AH-64 PI," you could get a profile of all Apache pilot requirements regardless of pilot name. On the other hand by using "MAJ SOBEY" and "AH-64 PI," you could get a profile of one individual's work just as an Apache pilot. To see what an individual is doing regardless of aircraft, you could use "MAJ WATERS" and "any code." Likewise for aircraft, "any resource" and "AH-64 AC" would show all Apache requirements. Using "84-12345" and "AH-64 AC" would show one aircraft's usage. Note that there is a resource called ANY. If you are using resources but you don't have a specific person's name yet, you can use ANY with the correct budget code to show the resource requirement. For example, when blocking out the LTF program, you need two pilots every work day for the year, but obviously you don't have these persons names. You would use ANY and "AH-64 PI" for unidentified Apache requirements, etc. Another important note is that ANY RESOURCE + ANY CODE in the resource profile is generally useless infomation because aircraft/people/etc. are all mixed together. However, that same combination in the expense profile gives you the total cost estimate for the project.

You should now have an idea of the project planning phase and capabilities of the program. However, ViewPoint can also give you project status information through its tracking function. Now change the display back to the network chart.

Move the crosshairs up to the upper-left corner and place them over the word PLAN. Now press the plus key. PLAN will change to TRACK. A dotted line will be drawn through the current status date. Let's assume that it is now 6 days into the project.

Press the F9 key to bring up the menu and select Post Progress. You should now see a progress form similar to figure 13. Type a date 6 days from the start of the project (for this PE, it would be 7 May 91). Press the minus key to accept this form. Now, a lighter dotted line appears showing where the projected status date is located. You need to update any progress made on your project.

Ideally, all activities which are completely left of the status line should be completed; all that are completely right of the line have not begun; and those which are partly on the line have made some progress. This would be the case if you had planned perfectly and everything was on schedule. Obviously, in the real world, things often go wrong.

For the PE, we will assume that the HFE task is complete. Point to the HFE activity (move the crosshair over the HFE activity and press plus). Now, highlight resources and point (press plus). You should be looking at the Resource Usage form as shown in figure 14. We will assume that we did a good job of estimating and the activity took the exact amount of labor we projected. Enter the actual amount of the resource used in the Actual column and zero out the remaining column since this activity is complete. The percent complete column should show 100%. Press minus to accept this form. Now enter 100% in the CMP field on the activity form and accept it (minus key). You should now be back in the network chart.

Now, we will assume that we have gotten a small start on the ground test. Point to the ground test activity. Highlight the RESOURCES and press plus. Let's assume that we have only finished 1 period of ground test. We need to show the use of 4 hours of AC time, and 4 hours for the pilot and engineer. The only difference will be in the remaining column we can't put a zero. We need to put in our estimate of how much more time will be required to complete this activity. If we feel our original estimate was accurate, we can simply subtract the actual from the remaining and enter that number in the remaining column. This system allows dynamic resource scheduling due to unforeseen problems in testing. We may use 4 hours and get nowhere and still need the full amount of programmed time to go. For this PE, we will assume our original estimates were accurate; so, for the aircraft, enter 4 in the actual column and 16 hours remaining. Do the same update for the pilot and engineer. We will assume Essex hasn't done anything on this activity yet; so, leave them at zero. Press the minus key to accept this form.

Now, press F9 to get the menu and go to the progress form again. Use the down arrow to get to Accept New Status Date and change the N to a Y. Press minus to accept the form. The dashed line, representing the status date, has moved forward to the current date; and you can see a visual representation of any activities which are behind schedule.

This has been a quick overview of some of the planning and execution tracking features of ViewPoint. Modeling your project is really quite simple if you take one step at a time and organize the events and activities into their proper flow.

The reporting features of VP are also useful for generating hardcopy documentation of your resource, timeline, or expense information. Go to the main menu by pressing F9 and selecting main menu. Then select Report. You are now looking at the report request list. The report name column is where you can choose one of the standard VP reports. Just point and you will get the list of reports. Let's look at a schedule chart first; so select SCHEDULE GANTT CHART (should be the first entry). The next column is the selection criteria. For this PE, we are only interested in the testing network; so, point to this field. Here we will select Network Name, = to, and TESTING as our selection criteria. The next column of Sort Criteria is usually left as Standard; however, if you need some special order of information, you would specify it here. For this PE, we will leave it at standard. The User Header column is primarily used to print a special title (called a Header) on the report. We will leave it at "No" for this PE so you can see the standard VP header information provided. The next column is the Output File. You can either specify a filename, or leave it at printer. For printer, VP will print the file on the printer you specified in the configure form. If you type a filename, VP will place the file in the report directory so you can view it on the screen. For this PE, type "pedemo" in this column. The last column should be left at default. Custom report definitions are beyond the scope of this PE.

When you have completed all that, press accept (minus key). The requested report will be generated. Since we didn't specify the printer, it will first appear that nothing has happened. From the main menu, select files. Now, from the files menu, select BROWSER. From the BROWSER menu, select reports. VP will now display a list of all reports available. Select "pedemo" (or whatever filename you used above). Now you should see the report displayed on the screen. You can use the arrow keys or mouse to scroll around on the screen and view the entire report. The GANTT schedule shows you project activities/events and the progress being made on them. A legend is prepared on the bottom of the report for interpretation. From the standard header information, you should be able to determine what special user information you need to add in the user header field.

Press Esc when you have finished viewing the report. Now, go back to the main menu and select report. You should experiment with all the reports to see which ones you like. Besides the schedule report, let's look at one more common report you might use, the Weekly Resource and Expenditure Report. Select Wkly Res/Expn (ES) in the first column (ES stands for early schedule). For selection criteria, again select Network Name, = to, and Testing. For the output file, select "pedemo" (or whatever filename you want). Accept the form. Now go to BROWSER under the files menu and select the report name to view. This report gives you the planned and actual expenses/resource usage for your

project by week. If you selected the Monthly Report, you see the same information except it is grouped by month rather than week.

One last word about reports. You can get multiple reports at once by creating an entire list in the report request screen rather than one at a time like we have been doing. To save this list so that you don't have to type it in each time, press F8 after you have made your complete list. Assign a unique filename to your report file, and it will become part of the VP reports library. From then on, just enter REPORTS and when the request screen appears, press F7. Then select the name you used to save the library.

This completes phase 2 of the PE. You can save your work if you like; however, the next phase of the PE will use some special project files already in VP to teach you some advanced concepts. You know enough now to plan and manage most projects in ATTC, so you can do phase 3 of the PE whenever you have the time.

Practical Exercise, Part 3

Welcome to phase 3 of the VP PE. This phase will teach you how to modify project calendars, use libraries, and manage multiple projects.

First, let's look at CALENDARS. Simply, CALENDARS specify to VP which days are workdays and which are holidays. The duration that you specify when creating activities is in workdays. Holidays are derived from the calendar to compute the total time a project will take. If you remember back to PE 1 and 2 when you were looking at the resource and expense profiles, there were bars going vertical to show resource usage; however, some dates did not have any resources shown. These gaps were, in fact, holidays derived from the STANDARD calendar. The STANDARD calendar is the default for use in your activities. For various reasons, you might need to create special calendars. Let's look at the results of creating a couple of special calendars.

Enter VP as always, and from the file menu, open the PX0123 project. Go to the network tree to get an idea of the scope of this project. This project is for the test and evaluation of a new widget for the AH-64 helicopter. It's basically the same breakdown (Planning, Testing, and Reporting) that we used in the other two PE phases. Press F9 from the network planning screen to get to the main menu. From there, select calendars. You are now looking at the STANDARD calendar. Press Esc to get the calendar menu, then select Create Calendar from the menu. You will now get a form to edit the basic information on the calendar. In the field where you see NO-NAME, type the name of your special calendar. Let's suppose that world tensions are tight and we will be on a mobilization schedule that works 6 days a week. For this PE, let's name the calendar MOBIL. Then, use the arrow keys to highlight the one day we won't be working. For this PE, let's highlight Sunday. Then, point to toggle the day from workday to holiday. As you can see, you could create anything from all holidays to all workdays for a special work schedule. This will change all days to comply with what you have selected. Now press ACCEPT (remember, ACCEPT is the minus key). Now from the calendar menu, select Edit Dates. This allows you to individually control certain days (like Federal holidays). Use the arrow keys to move around the calendar until you are on July 4. Point to this day. Note that the color of the day changes from blue to red. You have now changed that day from a workday to a holiday.

When working with new calendars, be sure to edit the workweek specifications first, then go in and set individual holidays. Whenever you edit the workweek, VP automatically erases all previously designated holidays.

If you want to use a standard 5-day workweek most of the time but have a short period where the workweek will change, you can use Range Edit from the calendar menu. Just enter the effective dates of the new schedule in the From and To blocks and then set the workweek. Remember that all individual holidays you had set during this period will be erased and will have to be reentered, if necessary. Press Esc to get to the main menu. Now select Project Specs. Look down at the bottom of the form, and you will see the default calendar is Standard. You could change the default calendar here to one of your special calendars, and every activity you created would automatically use that calendar unless you specified otherwise. For this PE, we will leave the default at Standard. Press Esc.

Now go to the project planning screen. Move to row 1 and 6 May 91. You should see the project summary. We will cover summary tasks a little later. Go to the network tree and move to the Testing Phase. Point to enter the network. Press the F10 key to get into the local mode. You should see the word LOCAL at the top of the screen. This will limit the graphs and forms to information in this node only. Now, get a resource profile of any resource. Note the black gaps showing the holidays. Now go back to the Network Planning Screen. (Press F9 and select change display.) Point to the flight test activity to get the activity form. Move down to the calendar field and select MOBIL (our 6-day/wk schedule). Press ACCEPT. Do the same thing for the REDEPLOY and TRAVEL activities. Now look at the resource profile again. The gaps that you saw in the first profile should have changed some. (There will still be gaps for Sunday and Jul 4).

We went through all that basically to show you that VP is flexible and you can use specialized calendars to get accurate time estimates for your projects completion. If you look at appendix C, you will see sample reports, both schedule and monthly expense, based upon this fictitious project. They may help you to understand what we are doing as we progress.

Now, press the F10 key again to leave the local mode. Get the menu (F9) and select activity editor. Select Activity Codes. You are now looking at a list of all the activities in this project and their associated codes. These codes are entered on the activity form in the CODE field. In the first two PEs, we left them blank, but now we will look at how they are used to create summary tasks.

Note that I have given everything in the planning phase a code of "apl," in testing "atl," and in reporting "arl." The summary tasks are created using these codes. Press Esc to exit from the table without making any changes. Now go to the top level of the network tree (XO 123) and enter the network (point). Change the display to the Network Chart and take a look at the summary tasks. Each task represents the time it takes to accomplish each

phase. Point to the Planning activity. Note that the code is "ap1," which means this task summarizes all activities that have "ap1" as a code. VP automatically calculates the duration of the task by taking the earliest start date of the earliest event or activity and subtracting it from the latest end date of the latest event or activity. To see what I mean, let's create a summary task for the entire project. Press ACCEPT to clear this form, and move down to row 3 and point. From the activity menu, select summary task. You can see that this form is very similar to the activity/event forms we worked with in the earlier phases of the PE. Type a name for the task (i.e., Proj XO 123). Enter a dummy duration, say 20. Now enter the code. We want to summarize all activities and events for this project. We have already seen that the codes are "ap1," "at1," and "ar1." There are several ways we could do this. The rules for specifying codes are similar to DOS filename rules. The * is a wildcard that matches any number of characters. To summarize our project, we could use "a*1." The * would allow the match of the p, t, and r characters (or any other group of characters) and effectively summarize our project. Likewise, the ? matches any single character in that position. Therefore, we could use "a?1" to match our codes. By now, you are probably wondering, so what! It doesn't seem important to be able to match so many combinations or to have so many codes. The reason we have to have this flexibility is for management's roll-up of projects. When all the projects are rolled up, the summary fields don't care what project they are summarizing. If all the test directors used "at1," "ap1," etc., the summary tasks would all be a wild conglomerate of durations. Therefore, each test director should use some unique ID in the code to prevent errors. For example, MAJ Waters' codes could end in 12, MAJ Sobey's in 13, etc. To summarize all MAJ Waters' projects, use *12 as the code. By using various combinations of letters, numbers, *, and ?, very sophisticated summaries can be produced. To review, * matches multiple characters, ? matches one; for example, "a*1" matches "aa1," "aaa1," "aqwerty1," "a2#@1," etc., while "a?1" matches "aa1," "ab1," "ac1," "a21," but not "aaa1." For this PE, use "a?1" in the code field and accept. Notice that the summary task has been created and conforms to the overall length of the project. Point to the summary and notice that VP has calculated the total duration (137 days).

The nice thing about having the project properly linked and summarized is that the impact of changes can be instantly evaluated. For instance, point to event 240. Let's say planning can't start until July 1. Move the cursor down until Target Date field is highlighted. Type 01Jul91. Press ACCEPT. The project is now rescheduled. Move to 1 July, and you should see the project correctly moved. If you go to any of the subnetworks, you will see the actual events and activities have been moved to their new locations. If you ever shift a project and things don't look right, you probably have the connections wrong or

going in the wrong direction. Let's look at the network diagram again. Use the F3 and arrow keys to compress the time scale until you can view the entire project on the screen. It begins with event 240 and ends with event 670. Notice the gray arrows. The arrow from event 240 points down, which means the connection goes from the top network down into one of the subnetworks. Generally, the project start will always go down. Look at event 670. The gray arrow is pointing up to 670. Normally the test complete event will have an up arrow. This should be obvious since no events or activities can begin until the project starts, while the overall project can't end until all events/activities below have been accomplished. Also note that event 240 has a shaded triangle denoting the event has been fixed by a date. Point to 240 and then highlight the target date. Press the spacebar and accept to clear the fixed date. Now, you can see that event 240 is once again a clear triangle.

To connect events or activities between different parts of the tree, you use basically the same procedure that was used in the first two PE phases. Position the cursor on the event/activity that the connection is from, and press connect (accept -- minus key). Then press F5 and move the cursor to the appropriate part of the tree and point. Now, move to the event/activity the connection is to and press CONNECT again. The connection is complete. If you have several connections to do between two parts of the tree, you can use F6. Let's make an inter-tree connection to see how it's done. Move the cursor about midway above the Planning summary task and point. Create event 270, Safety Assessment Report (SAR) Received. Let's assume we can write the draft test plan but not the final plan until the SAR arrives at ATTC. This event then controls when the final writing of the plan can begin; therefore, we want to make a connection between event 240 and the start of Publish Final Plan activity. Move the cursor over the v of 270, and press connect. Now press F5 and move the cursor to PLANNING. Press point. Now move the cursor over the left half of the Pub Final Plan activity and press CONNECT again. There will be no lag; so, accept the form. Now press F6. You are back in the top of the tree, and hopefully there is a gray down arrow coming off event 270. Now press F6. You are back in the Planning node of the tree. Hopefully, there is a gray up arrow off the start of the activity. Now press F6 again. Go to event 270 and point. Let's assume the SAR is delayed and won't arrive until 1 Oct 91. Move the cursor until Target Date is highlighted and enter 01Oct91. The schedule should be adjusted. Press F6 to view the changes to the planning phase of the project. Note in the planning phase that you now have slack time available (blue activities) caused by the SAR delay.

Now go back to the top of the tree (PX0123). A hammock is also a way to summarize work, but it must be linked to events to give it the proper duration. Go down to row 4 in the top level of the

tree and point. Now select Hammock. Enter Proj XO 123 for the name. Enter any number for the duration. Press accept. Now connect event 240 to the hammock. Connect event 670 to the hammock. The hammock has now automatically expanded (or contracted) to show the duration of the project. Hammocks can summarize data without codes; however, you have to connect them to the events/activities they are to summarize. I prefer to use summaries so I don't have messy, green connections running through my project.

You now know just about everything you need to know to do some pretty fancy work with VP and produce detailed cost estimates, resource controlling, and project scheduling.

Let's look now at how we can optimize all the hard work you have done the next time you get a similar project. Press F5 and enter the testing Mode of the tree. Let's say you have another project coming up which is identical (or nearly so) to this one. Press F9 and from the menu, select Cut-Copy-Paste. Move the cursor to the upper left-corner of the project. You will note that the cursor is blue. Press point. You have now anchored one corner of the cut/copy rectangle which is called a region. Now, move the cursor down and right until the blue area completely encloses the area we want to save. In this PE, we want all of it; so, keep going until the whole project is in the blue area. Press point to anchor the other corner of the region. Now you have several options. You could cut this out and move it somewhere else in the project; you could copy this region to another place in the project while leaving a copy here; or, you could place this on the LAN where other test directors (including yourself) do not have to reinvent the wheel every time you have a similar project. For this PE, we are going to place it in the project library. Press F8 for library export. At the prompt, just give this a name, like DTTDYTST and accept. Now press Esc to show that you have finished. Go to the network tree and create a new node called "test1" (remember=> shift+arrow). Then enter this node. Now, press F7 to import library regions. You will see a menu of all available library regions which you might want to use. Find our DTTDYTST (or whatever you called it) and point. Now, move the region until it is at the appropriate place (for this PE, anywhere is OK), and point. Now press Esc. Note that you can paste as many copies of the region as you want. Every time you point, another copy will be pasted until you signal completion by pressing Esc.

You can have region libraries, calendar libraries, resource libraries, and budget code libraries. We won't toil through all these because the principles are identical.

Now it's time to look at some multi-project management with VP. Often you will have more than one project going on at once; of course, management will want to roll up resource totals by

opening multiple projects. In VP, it's really quite simple to view multiple projects.

Call up the main menu and select Files. Now select New. When VP asks if you want to leave without saving, answer Yes. Don't save your work over the top of the PXO123 file or the next test director who tries to do the PE will be confused!!

Now, go back to the planning screen. Press F5 to look at the network. Press F2 and change the name of the Top Level to ATTC. (This isn't really necessary, except as eyewash). Now, press F7. You should remember F7 from above--Import library. In this case, it is import a project. Now, we want to view a project. As the manager, you can scroll down the list to select any project you want. Let's get our friend PXO123. Just select that file the way you would any. VP will now ask for an arrow direction. We want the projects to be below ATTC at the top; so, press down arrow. Now, XO123 has been added to the tree. Let's say we also want to look at the lead-the-fleet profiles which are all under PLTF. Move the cursor down to XO 123, then press F7. Now select PLTF. When VP asks for an arrow, this time press right arrow. Now, LTF will be placed below ATTC but co-equal with XO 123. As you paste projects into the screen, they will generally all be co-equal. If an XO was a subordinate project of another XO, you would have to use down arrow from the first XO to put it in proper position. You would simply continue to paste projects until they had all been rolled-up. If you call up a resource profile from any project, you will get the resources for just that project. If you call up the resources from ATTC, you would get the total resources committed by all projects.

Move the cursor to ATTC and point. You are now in the top level for total resource roll-ups. Press F9, and select change display and then resource profile. Let's look at the total requirements for AH-64 pilots in the activity during Jul 91. Select any resource at the prompt. The graph now is pretty much garbage because the hours are a conglomerate of aircraft, people, and contractor hours. Move the cursor over any code and select AH-64 PI. Now the graph shows all requirements for AH-64 pilots. The scale is in hours; so, to get the number of people you have to check on what individual requirements there are. Move the cursor until it is on 23 Jul 91. Now press "t." This is the trace function. In the top center of the screen you will see the activity description; and on the graph, the shaded portion on the bottom of the screen will represent the percent of resources committed to the project. Press the spacebar to view each project part in turn. (Note that 16 hours of pilot time are devoted to travel and 8 hours time to LTF).

To get a rough estimate, you could just divide by 8 (assuming 8 hours/day/pilot). However, some TDY people may be blocked out for 24 hours/day to prevent their scheduling back at ATTC. It's

better to double check requirements by using the trace function. This roll-up of resources is where the LEVEL and CONSTRAIN functions can come in handy. If your requirements exceed the number of available pilots, then you will have to level or constrain your projects to make them fit the available resources.

Play around with the various resource/expense displays to get a feel for what VP will do for you. Remember, you can import as many or as few projects as you desire to view. You can go to the report form and order up schedule charts on whatever projects you desire by using the selection criteria.

Hopefully, these PEs have introduced you to the major parts of VP and have given you an overview and firm foundation with which to plan, track, and report on your project. For any questions that arise, you can look up the topic in the technical reference portion of the handbook; press the F1 key while in VP; or ask the VP project officers (MAJ Waters/Mr. Wise) for assistance. Good Luck and Have Fun!!

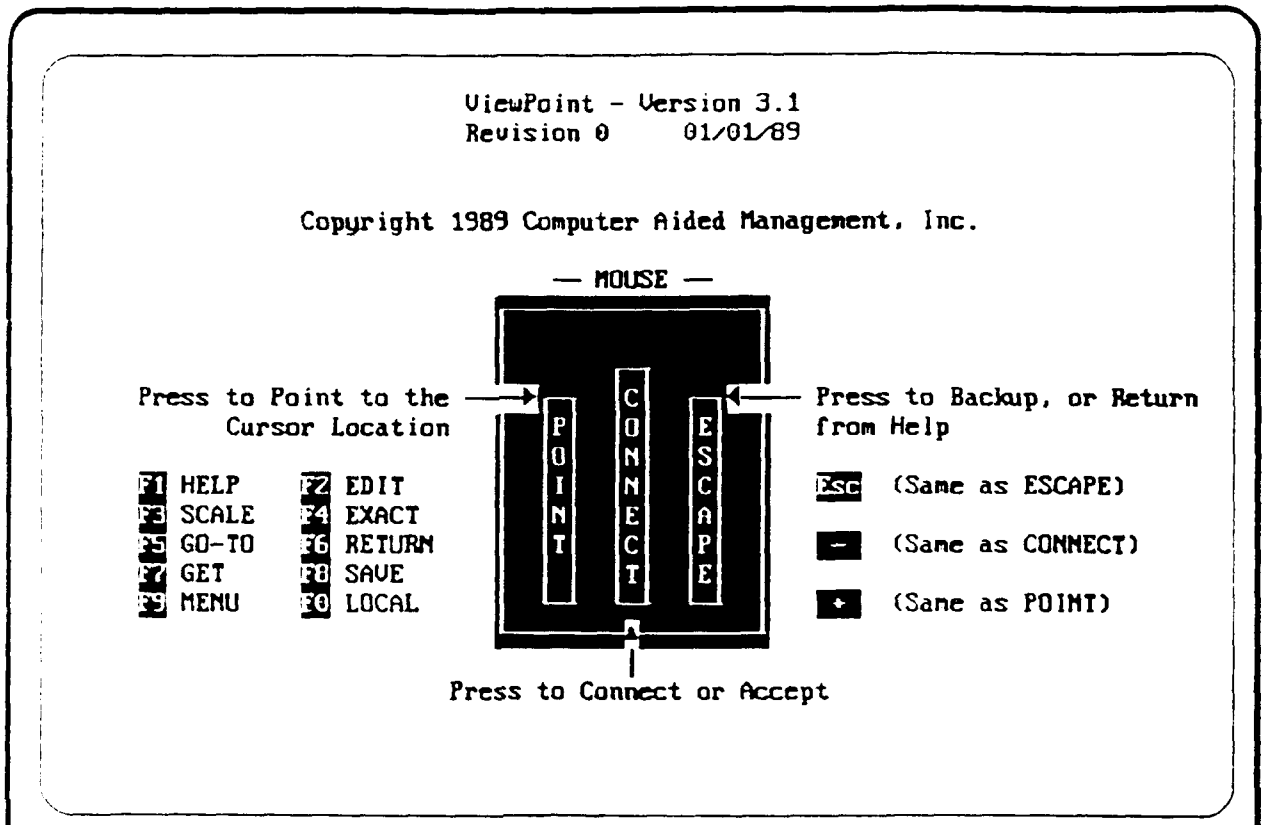


Figure 1

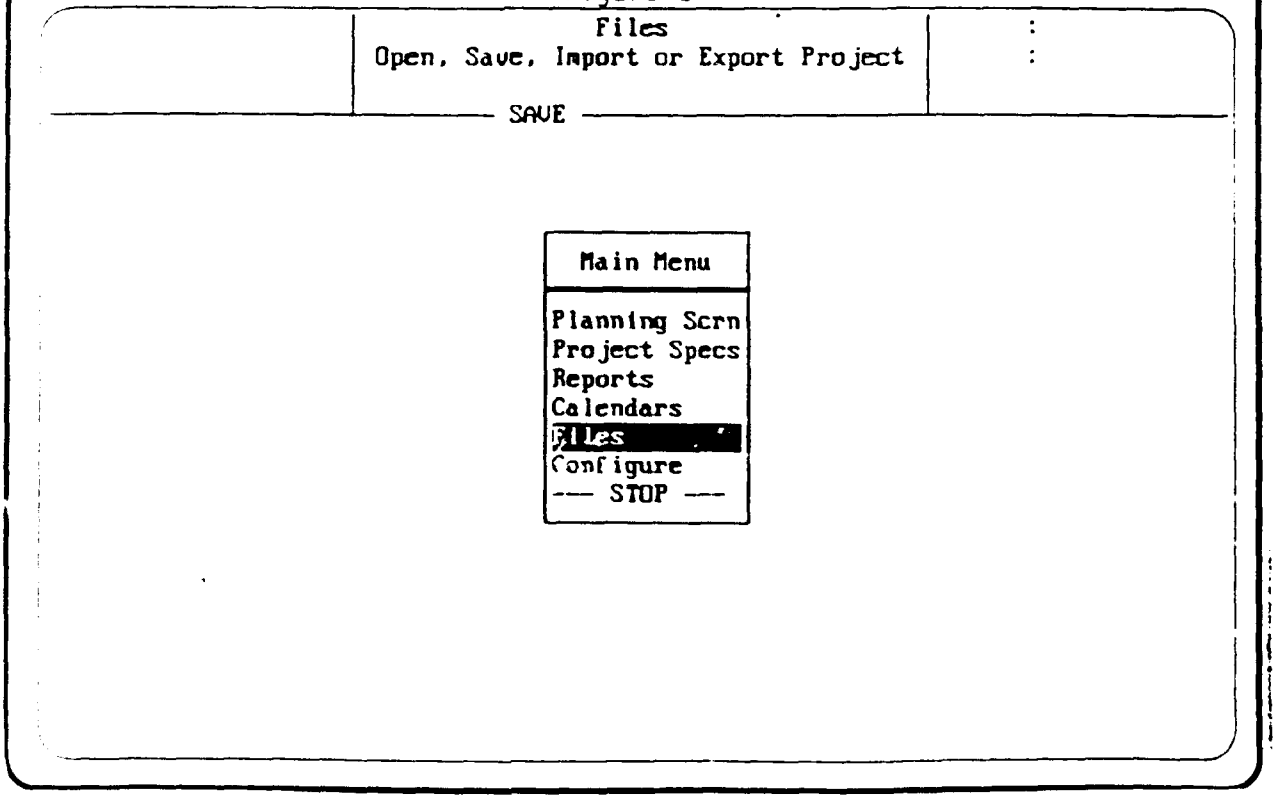


Figure 2

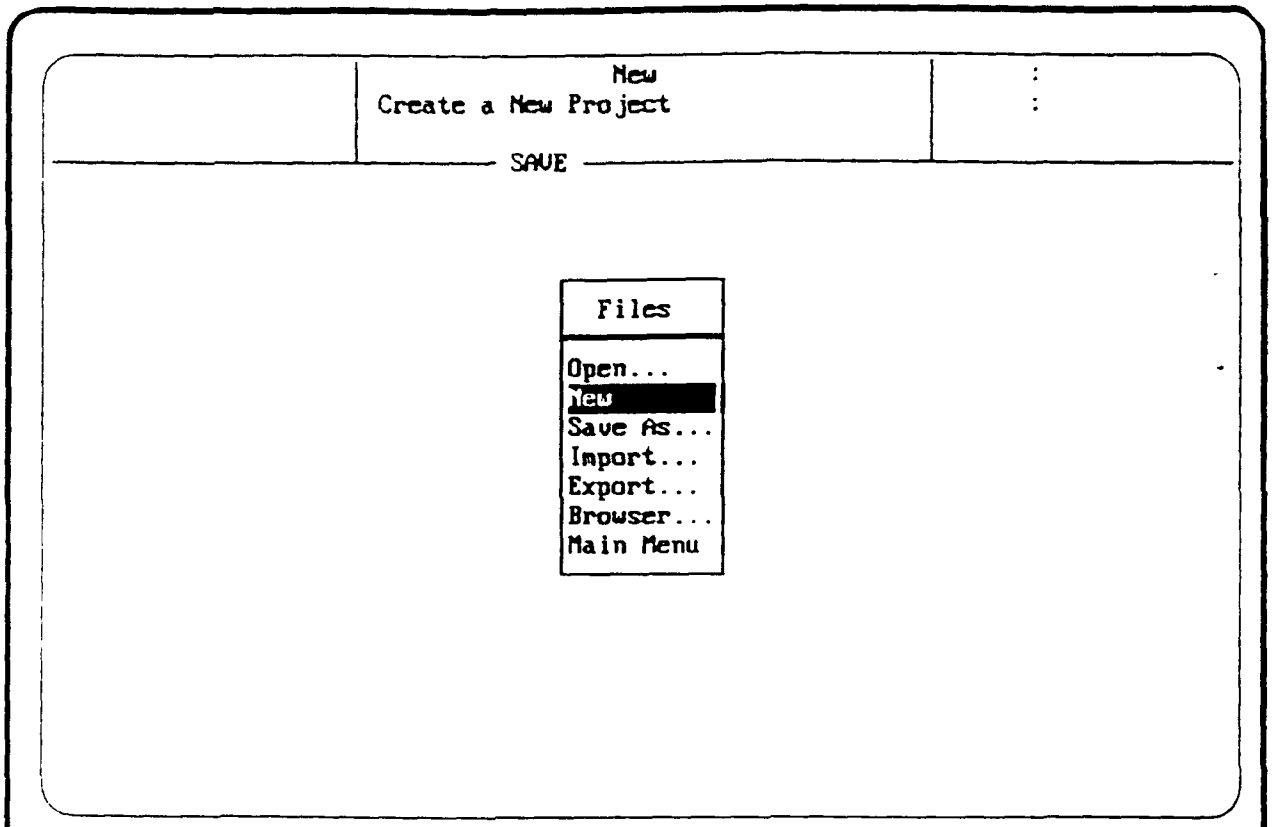


Figure 3

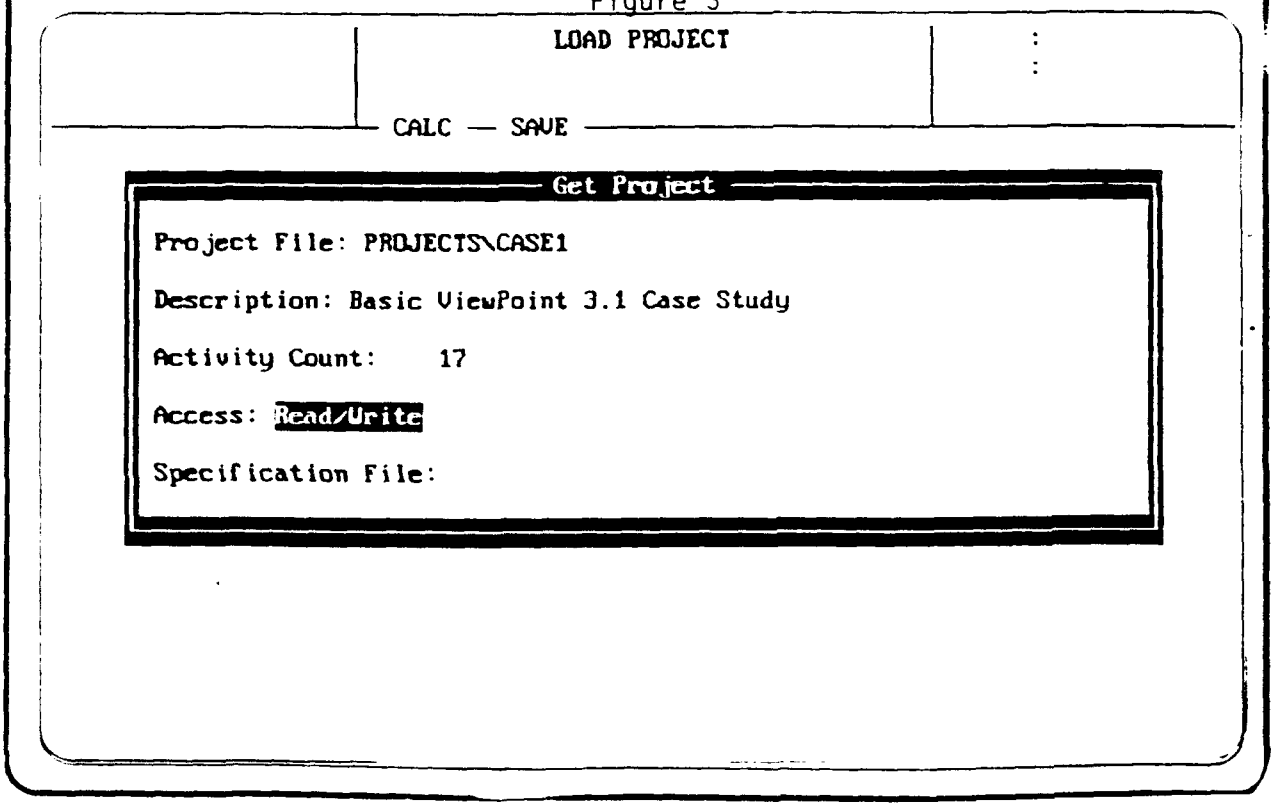


Figure 4

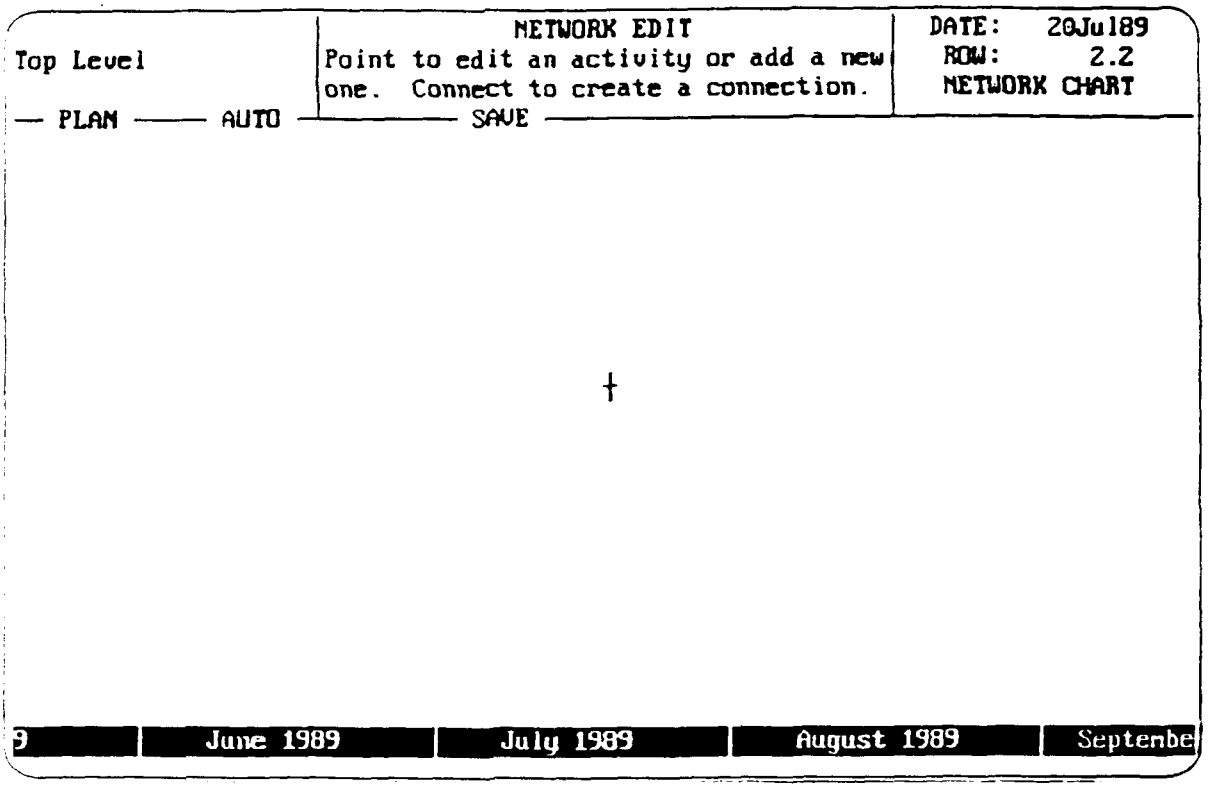


Figure 5

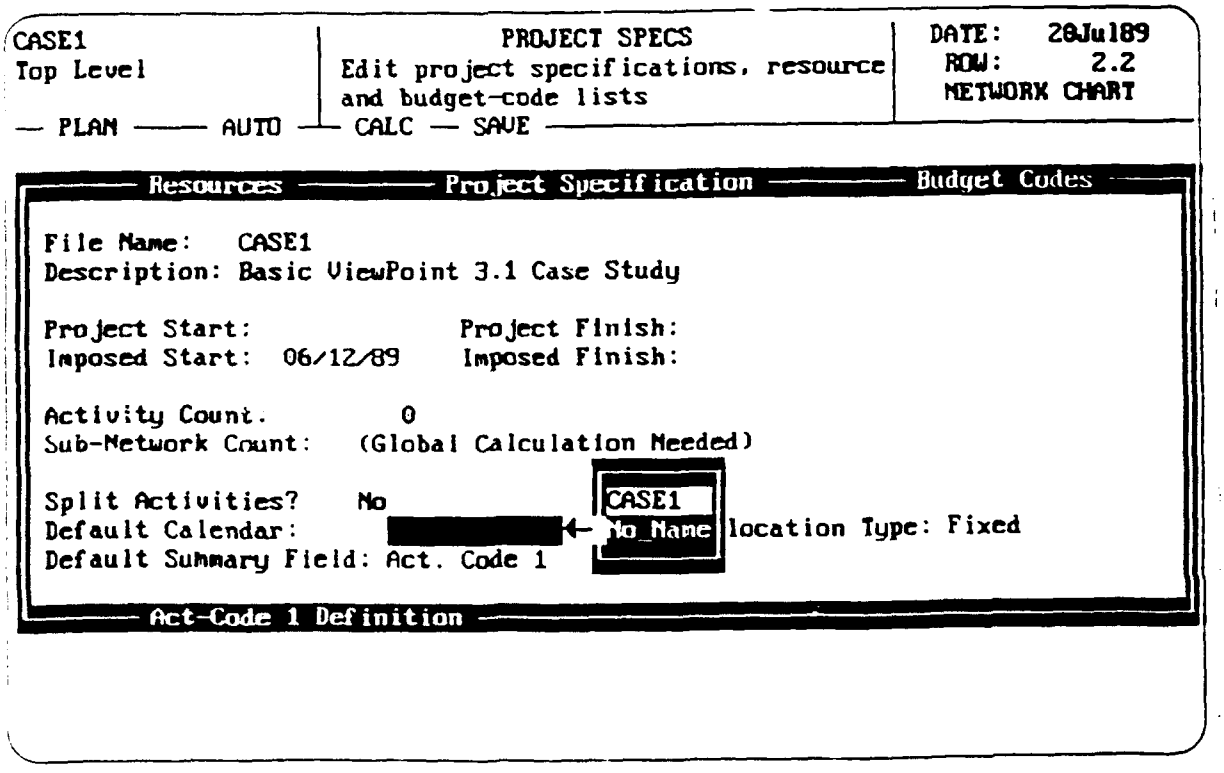


Figure 6

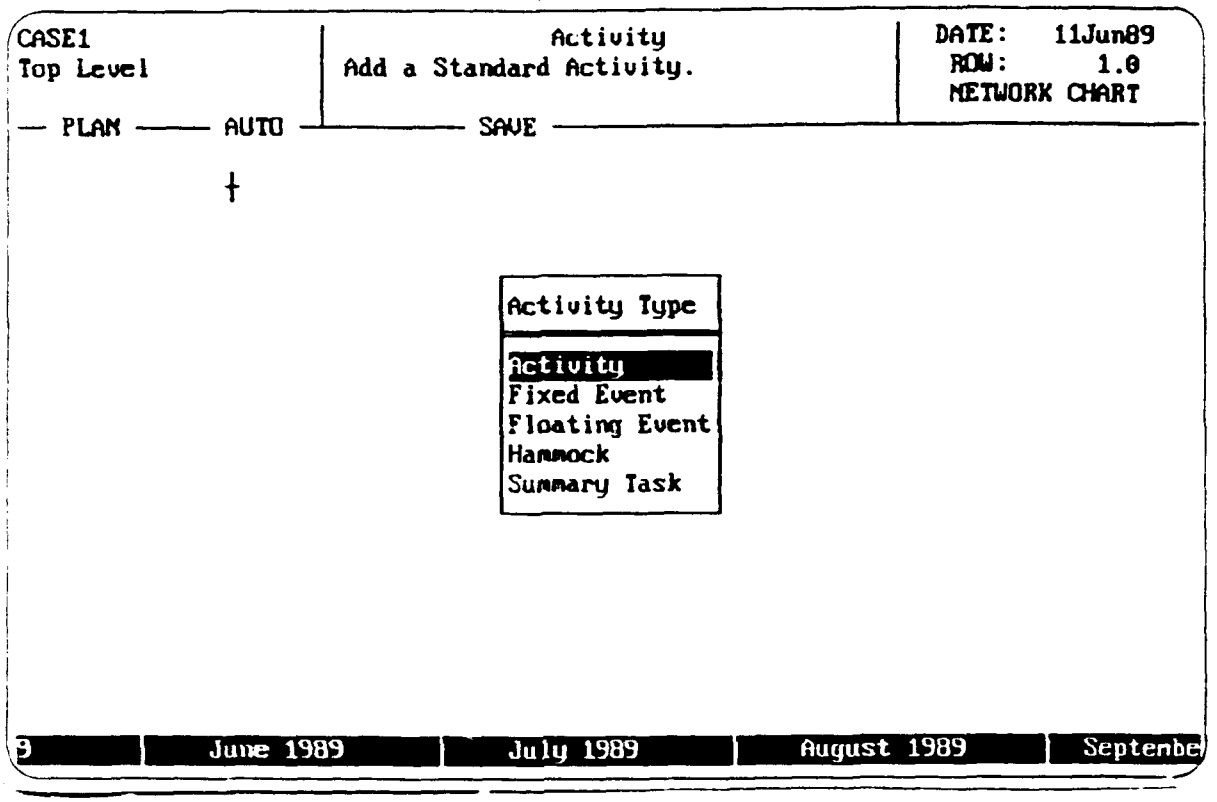


Figure 7

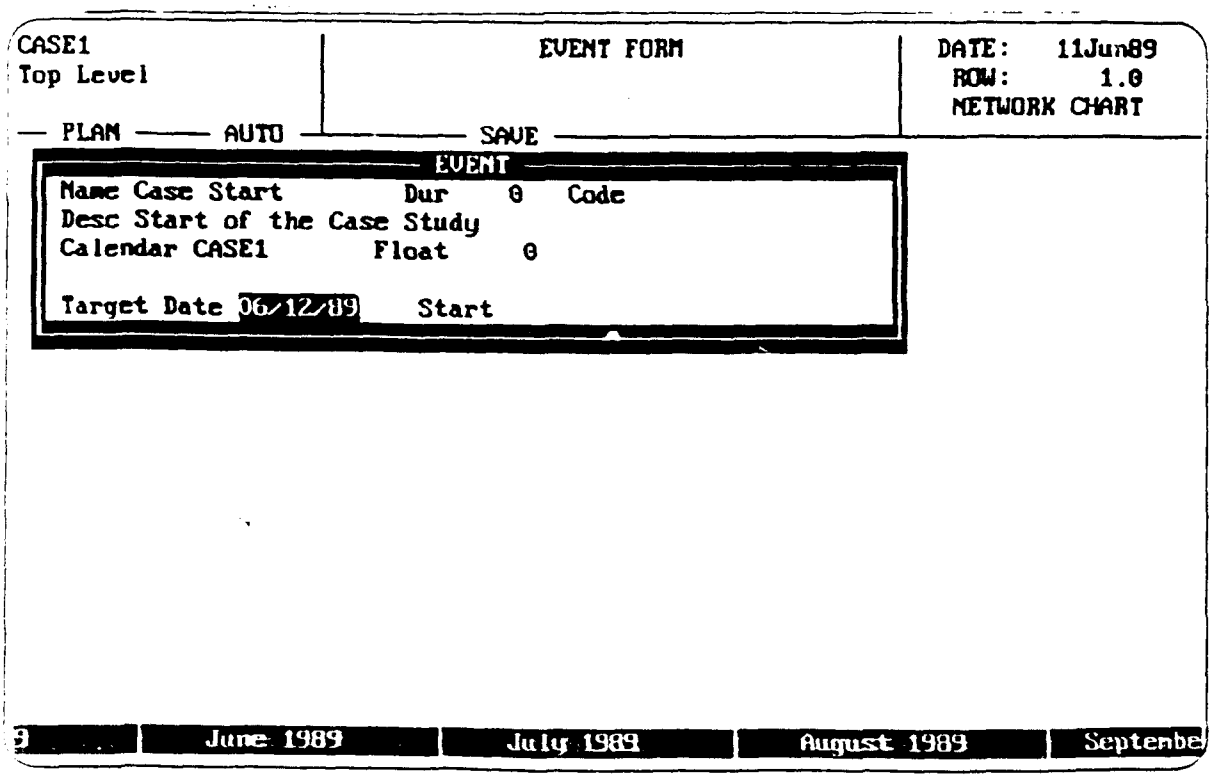


Figure 8

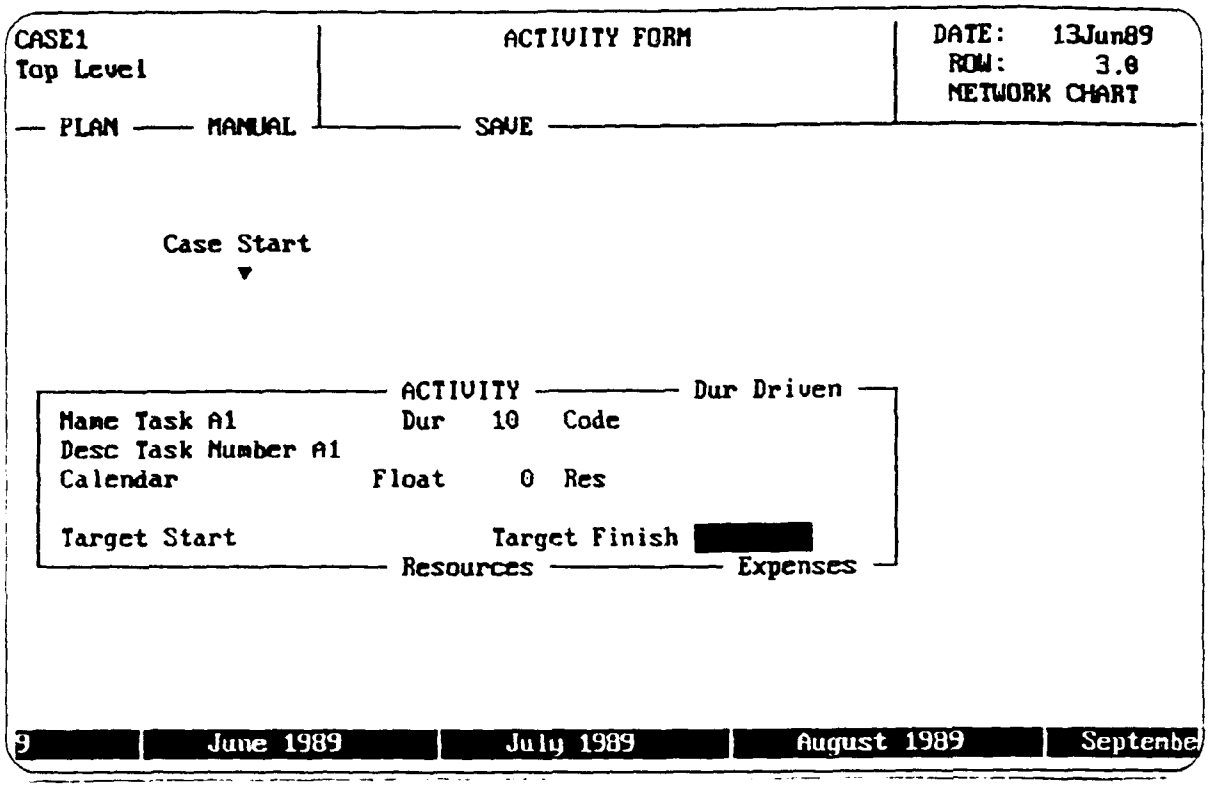


Figure 9

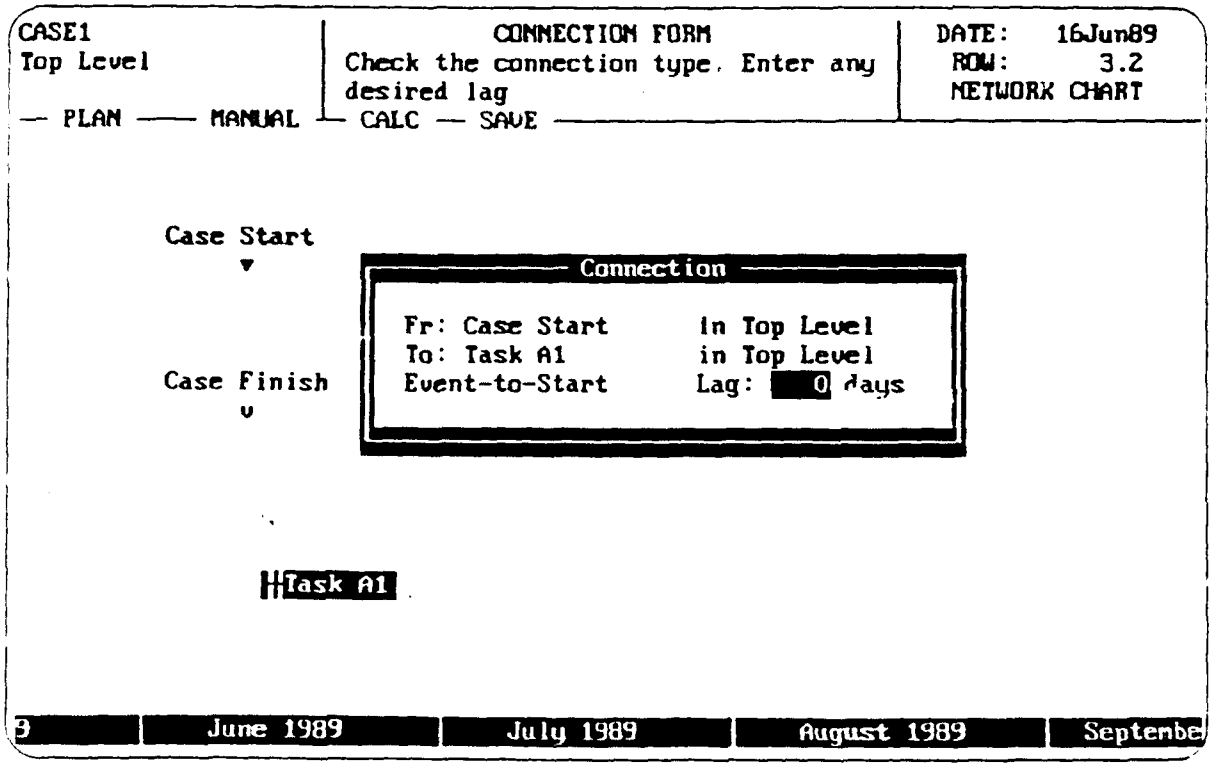


Figure 10

CASE1
Top Level

EDIT RESOURCES
Add New Categories of Resources, or
Edit Existing Resource Information.

DATE: 18Jun89
ROW: 3.2
NETWORK CHART

— PLAN —— MANUAL —— SAVE —— CAPS —

Resource Information

Resource Name	Resource Group	Resource Description	Expense Rate	Unit Msr.
SGA	SGA	Skill Group A	$ 16.88	MHr
SGC	SGC	Skill Group C	$ 9.38	MHr
SGD	SGD	Skill Group D	$ 12.50	MHr
SGE	SGE	Skill Group E	$ 18.75	MHr
SGI	SGI	Skill Group I	$ 7.50	MHr
SGO	SGO	Skill Group O	$ 11.25	MHr
SGP	SGP	Skill Group P	$ 13.75	MHr
SGT	SGT	Skill Group T	$ 15.63	MHr
EQC	EQC	Equipment C	$ 1.00	Unit
TEL	TEL	Telecommunications	$ 1.00	Unit
TRV	TRV	Travel	$ 1.00	Unit
EQD	EQD	Equipment D	$ 1.00	Unit
MTL	MTL	Material	$ 1.00	Unit

Figure 11

CASE1
Top Level

'ESOURCES SUB-FORM
Add and change resource commitment
information

DATE: 18Jun89
ROW: 3.2
NETWORK CHART

— PLAN —— MANUAL —— SAVE —— CAPS —

Track — ACTIVITY — Res Driven
Name Task A1 Dur 10 Code
Desc Task Number A1

Resource Usage

Resource Name	Code	Plan		Rate		Dur	
SGC	A001	40 MHr	=	4.00	x	10	F
SGE	A001	80 MHr	=	8.00	x	10	F
	<-	0	=	0.00	x	10	F

Task

Task D1 — Task D2

June 1989 July 1989

Figure 12

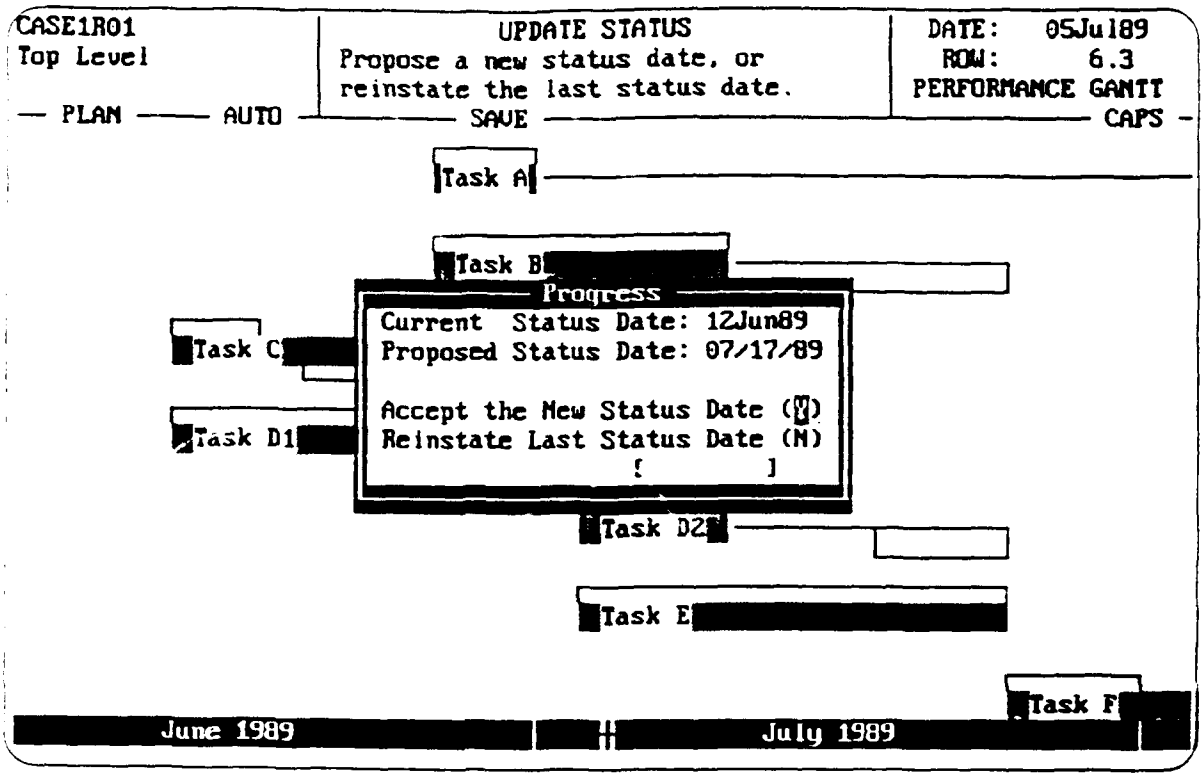


Figure 13

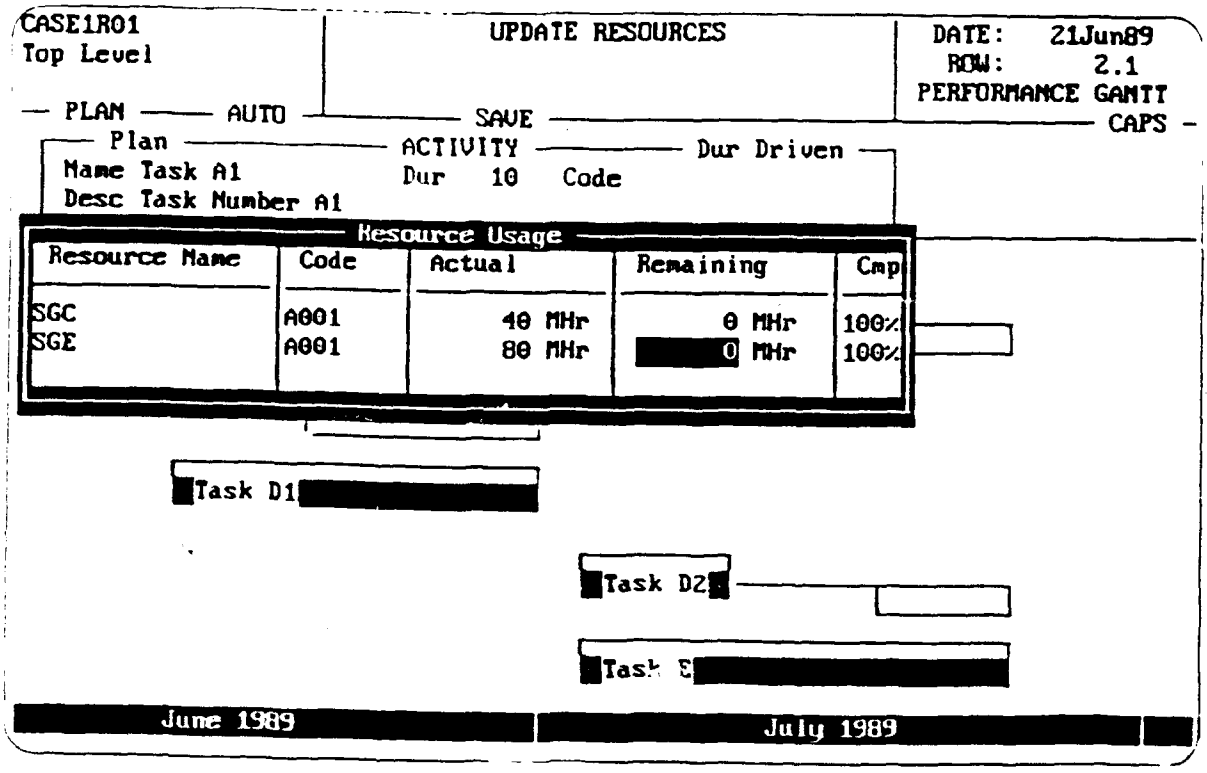


Figure 14

VIEWPOINT REFERENCE KEYS

Function Keys

F1 HELP => Get context sensitive help about a function. Help is always available from any screen.

F2 EDIT => Edit an entry rather than retype the whole thing. Edit is only available in form fields.

F3 SCALE => Change the time scale at the bottom of the screen. (Used with LEFT-ARROW and RIGHT-ARROW) Available in planning screens only.

F4 EXACT => Make the date move only one day at a time regardless of the scale being used. (Makes the cursor move slowly but precisely). Available in planning screens only.

F5 GOTO => Go to the network tree screen from the edit screen. Available from planning screen only.

F6 RETURN=> Return to the last network chosen. Used in conjunction with F5.

F7 GET => Get a library from disk. Libraries may be Network Charts, Resource or Budget Code screens, Network Trees, Calendar Displays, or Import/Export forms.

F8 SAVE => Save the current screen as a library.

F9 MENU => Pop Up the current menu. Normally used from the planning screen display.

F10 LOCAL => Select Local Mode. Restrict operations and calculations to the current network only. Normally used in Network Tree, Network Chart, Activity and Resource/Expense Editors.

Mouse Keys

\+ => Point: Used to select a menu item, select an activity to edit, or create an activity at a given date.

\- => Connect/Accept: Used to connect activities and events in the network edit screen, or to accept forms.

ESC => Escape: Leave a form without accepting any changes. If at the screen level, ESC will bring up a menu.

Toggle=> Spacebar: Sequence through items in trace or find modes.

Alternate Keys

ALT-V => Version: Brings the version screen up which also shows the uses of the main keys.

ALT-F -> Find: Find an activity or a part of a tree. If you have many activities, this helps you home to the correct one. You can use * as a wild card to look at all activities that begin with certain characters, i.e., "RE*" will find RELT and REX and RE....

ALT-N => Select next activity during a find. Used when a wildcard like * is used as a name during a find operation.
ALT-D => Delete an entry.
ALT-U => Undelete an entry/Restore.
ALT-S => Sort: Order a table.
ALT-P => Print Screen.
ALT-R => Reverse Schedule.

Hot Keys

PrtScn => Print Screen, DO NOT USE SHIFT!
* => Print current screen.
T or t => Trace mode
Delete => Delete characters in form entries.
Spacebar=> Sequence through items during a trace.

Cursor Movement

Home => Go to top of form, menu, top level of network tree, or start date of calendar.
End => Go to bottom of form, menu, or 10 years after start date of calendar.
Page Up => Move one page up in editors or one screen up in planning displays.
Page Dn => One page down in editors, one screen down in planning screen.
Ctrl-arrow=> Move one screen left, right, up, or down.
arrow => Move cursor one space left, right, up, or down.

Project Name: PX0123
Network Name: PX0123

ViewPoint
Schedule Barchart Report

Status Date: April 4, 1991
Run Date: May 1, 1991
Page 1

Activity Name and Description	Rem Dur	1991 May 6	May 25	Jun 12	Jul 1	Jul 19	Aug 6	Aug 25	Sep 12	Sep 30	Oct 19	Nov 6	Nov 24
240 Initiate Planning XO 123	0	v											
Planning Phase Planning Activities Summary XO 123	55	----------											
330 Planning Complete	0					v							
Testing Phase Test phase of XO 123	55					----------							
550 Testing Complete	0									v			
Report Phase Reporting Phase of XO 123	35									----------			
670 Test Completed	0												v

Legend: ==== Early Schedule
.... Late Schedule
:::: Progress
---- Summary
++++ Hammock
v Event

Each Character = 2.62 Days

Activity Name and Description	Rem Dur	1991 May 6	May 25	Jun 12	Jul 1	Jul 19	Aug 6	Aug 25	Sep 12	Sep 30	Oct 19	Nov 6	Nov 24
240 Planning Initiated for Widget Test XO 123	0	v											
Cost Estimate Prepare Cost Estimate for Widget Test	15	========											
170 Cost Estimate Complete	0		v										
Req Funds Request and receive funding to continue project	20		==========										
Prep Test Plan Prepare initial test plan for XO 123 widget test	10			======									
309 PRC Initial Plan	0				v								
Pub Final Plan Publish final test plan, XO 123	10				======								
321 Final test plan published and complete	0					v							
330 Test Planning Completed	0					v							

Legend: ==== Early Schedule
.... Late Schedule
:::: Progress
---- Summary
++++ Hammock
v Event

Each Character = 2.62 Days

Activity Name and Description	Rem Dur	1991 May 6	May 25	Jun 12	Jul 1	Jul 19	Aug 6	Aug 25	Sep 12	Sep 30	Oct 19	Nov 6	Nov 24
Draft Report	15												
Prepare draft report											=========		
558	0												
PRC Test Report												v	
Prep Final Rpt	10												
Prepare Final Report												======	
Return Funds	10												
Return unused funds to customer													======
670	0												
Project Complete													v

Legend: ==== Early Schedule
.... Late Schedule
:::: Progress
---- Summary
++++ Hammock
v Event

Each Character = 2.62 Days

Activity Name and Description	Rem Dur	1991 May 6	May 25	Jun 12	Jul 1	Jul 19	Aug 6	Aug 25	Sep 12	Sep 30	Oct 19	Nov 6	Nov 24
Travel Test team travels to remote site for test	5					:::							
390 Trooos arrive at TDY station	0					v							
NETT Tng New Equip Tng by Contractor at remote site	15						::::::::						
440 Begin Testing of Widget XO 123	0							v					
Flight Test Conduct Flight Test Program at remote site	30								::::::::::::::::				
442 Begin Reducing Data	0									v			
Data Reduction Reduce project data at Ft Rucker for Flt Test	20									::::::::::			
549 Data Reduction/Data acquisition complete	0										v		
550 Flight Test complete at remote site	0										v		
Redeploy Return Test team and aircraft to Ft Rucker	5										::::		
550 Testing complete	0											v	

Legend: :::: Early Schedule
.... Late Schedule
:::: Progress
---- Summary
++++ Hammock
v Event

Each Character = 2.62 Days

Project Name: PX0123
Network Name: Planning

ViewPoint
Monthly Resource & Expense Report
Early Start Schedule

As Of Date: April 4, 1991
Run Date: May 1, 1991
Page 1

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
01May91-31May91	Adee, D. LTC	Cost Estimate Prepare Cost Estimate for Widget Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 1 Hr	0 0. 13
	Adee, D. LTC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 1	0 0 13
	Miller, R. GM14 Engineer	Cost Estimate Prepare Cost Estimate for Widget Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 2 Hr	0 0 23
	Miller, R. GM14 Engineer	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 0 Hr	0 0 5
	Miller, R. GM14 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 2	0 0 28
	Roberts, A.GS-09	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 2 Hr	0 0 19
	Roberts, A.GS-09	Resource Totals:	PLAN ACTUAL REMAINING	0 0 2	0 0 19
	Stinson, G.GM-13	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 0 Hr	0 0 5
	Stinson, G.GM-13	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 5

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Venegas, M. GS13 Engineer	Cost Estimate Prepare Cost Estimate for Widget Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 8 Hr	0 0 95
	Venegas, M. GS13 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 8	0 0 95
01May91- 31May91		Period Totals:	PLAN ACTUAL REMAINING	0 0 13	0 0 160
01Jun91- 30Jun91	Adee, D. LTC	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 1 Hr	0 0 10
	Adee, D. LTC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 1	0 0 10
	Armbrust, J.CW3 AH-64 PI	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 4 Hr	0 0 48
	Armbrust, J.CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 4	0 0 48
	Miller, R. GM14 Engineer	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 2 Hr	0 0 19
	Miller, R. GM14 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 2	0 0 19

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Roberts, A.GS-09	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 6 Hr	0 0 77
	Roberts, A.GS-09	Resource Totals:	PLAN ACTUAL REMAINING	0 0 6	0 0 77
	Stinson, G.GM-13	Req Funds Request and receive funding to continue project	PLAN ACTUAL REMAINING	0 Hr 0 Hr 2 Hr	0 0 19
	Stinson, G.GM-13	Resource Totals:	PLAN ACTUAL REMAINING	0 0 2	0 0 19
	Venegas, M. GS13 Engineer	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 1 Hr	0 0 10
	Venegas, M. GS13 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 1	0 0 10
01Jun91-30Jun91		Period Totals:	PLAN ACTUAL REMAINING	0 0 15	0 0 182
01Jul91-31Jul91	Adams, E. GS11	Pub Final Plan Publish final test plan, XO 123	PLAN ACTUAL REMAINING	0 Hr 0 Hr 10 Hr	0 0 120
	Adams, E. GS11	Resource Totals:	PLAN ACTUAL REMAINING	0 0 10	0 0 120

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Adee, D. LTC	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 1 Hr	0 0 14
	Adee, D. LTC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 1	0 0 14
	Armbrust, J.CW3 AH-64 PI	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 6 Hr	0 0 72
	Armbrust, J.CW3 AH-64 PI	Pub Final Plan Publish final test plan, XO 123	PLAN ACTUAL REMAINING	0 Hr 0 Hr 5 Hr	0 0 60
	Armbrust, J.CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 11	0 0 132
	Rindfusz, R.GS05	Pub Final Plan Publish final test plan, XO 123	PLAN ACTUAL REMAINING	0 Hr 0 Hr 20 Hr	0 0 240
	Rindfusz, R.GS05	Resource Totals:	PLAN ACTUAL REMAINING	0 0 20	0 0 240
	Venegas, M. GS13 Engineer	Prep Test Plan Prepare initial test plan for XO 123 widget test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 1 Hr	0 0 14
	Venegas, M. GS13 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 1	0 0 14
01Jul91- 31Jul91		Period Totals:	PLAN ACTUAL REMAINING	0 0 43	0 0 521

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
		Network Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	72	863

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
01Oct91-31Oct91	Adams, E. GS11	Draft Report Prepare draft report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 45 Hr	0 0 540
	Adams, E. GS11	Resource Totals:	PLAN ACTUAL REMAINING	0 0 45	0 0 540
	Armbrust, J. CW3 AH-64 PI	Draft Report Prepare draft report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 45 Hr	0 0 540
	Armbrust, J. CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 45	0 0 540
	Lester, G. CW4 AH-64 PI	Draft Report Prepare draft report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 15 Hr	0 0 180
	Lester, G. CW4 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 15	0 0 180
	Rindfusz, R.GS05	Draft Report Prepare draft report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 60 Hr	0 0 720
	Rindfusz, R.GS05	Resource Totals:	PLAN ACTUAL REMAINING	0 0 60	0 0 720
01Oct91-31Oct91		Period Totals:	PLAN ACTUAL REMAINING	0 0 165	0 0 1980

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
01Nov91-30Nov91	Adams, E. GS11	Prep Final Rpt Prepare Final Report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 40 Hr	0 0 480
	Adams, E. GS11	Resource Totals:	PLAN ACTUAL REMAINING	0 0 40	0 0 480
	Rindfusz, R.GS05	Prep Final Rpt Prepare Final Report	PLAN ACTUAL REMAINING	0 Hr 0 Hr 60 Hr	0 0 720
	Rindfusz, R.GS05	Resource Totals:	PLAN ACTUAL REMAINING	0 0 60	0 0 720
	Roberts, A.GS-09	Return Funds Return unused funds to customer	PLAN ACTUAL REMAINING	0 Hr 0 Hr 5 Hr	0 0 60
	Roberts, A.GS-09	Resource Totals:	PLAN ACTUAL REMAINING	0 0 5	0 0 60
	Stinson, G.GM-13	Return Funds Return unused funds to customer	PLAN ACTUAL REMAINING	0 Hr 0 Hr 3 Hr	0 0 30
	Stinson, G.GM-13	Resource Totals:	PLAN ACTUAL REMAINING	0 0 3	0 0 30
01Nov91-30Nov91		Period Totals:	PLAN ACTUAL REMAINING	0 0 108	0 0 1290
		Network Totals:	PLAN ACTUAL REMAINING	0 0 273	0 0 3270

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
01Jul91-31Jul91	90-00180 AH-64 AC	NETT Trng New Equip Trng by Contractor at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 0 Hr	0 0 0
	90-00180 AH-64 AC	Travel Test team travels to remote site for test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 10 Hr	0 0 0
	90-00180 AH-64 AC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 10	0 0 0
	Armbrust, J.CW3 AH-64 PI	NETT Trng New Equip Trng by Contractor at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 8 Hr	0 0 96
	Armbrust, J.CW3 AH-64 PI	Travel Test team travels to remote site for test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 40 Hr	0 0 480
	Armbrust, J.CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 48	0 0 576
	Lester, G. CW4 AH-64 PI	NETT Trng New Equip Trng by Contractor at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 8 Hr	0 0 96
	Lester, G. CW4 AH-64 PI	Travel Test team travels to remote site for test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 40 Hr	0 0 480
	Lester, G. CW4 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 48	0 0 576

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	TDY	NETT Tng	PLAN	0 unit	0
		New Equip Tng by Contractor at remote site	ACTUAL	0 unit	0
			REMAINING	0 unit	200
	TDY	Travel	PLAN	0 unit	0
		Test team travels to remote site for test	ACTUAL	0 unit	0
			REMAINING	0 unit	1000
	TDY	Resource Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	0	1200
01Jul91-31Jul91		Period Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	106	2352
01Aug91-31Aug91	90-00180 AH-64 AC	Flight Test	PLAN	0 Hr	0
		Conduct Flight Test Program at remote site	ACTUAL	0 Hr	0
			REMAINING	32 Hr	0
	90-00180 AH-64 AC	NETT Tng	PLAN	0 Hr	0
		New Equip Tng by Contractor at remote site	ACTUAL	0 Hr	0
			REMAINING	2 Hr	0
	90-00180 AH-64 AC	Resource Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	34	0
	Armbrust, J.CW3 AH-64 PI	Flight Test	PLAN	0 Hr	0
		Conduct Flight Test Program at remote site	ACTUAL	0 Hr	0
			REMAINING	64 Hr	768
	Armbrust, J.CW3 AH-64 PI	NETT Tng	PLAN	0 Hr	0
		New Equip Tng by Contractor at remote site	ACTUAL	0 Hr	0
			REMAINING	112 Hr	1344
	Armbrust, J.CW3 AH-64 PI	Resource Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	176	2112

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Lester, G. CW4 AH-64 PI	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 64 Hr	0 0 768
	Lester, G. CW4 AH-64 PI	NETT Trng New Equip Trng by Contractor at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 112 Hr	0 0 1344
	Lester, G. CW4 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 176	0 0 2112
	Rent	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 800
	Rent	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 800
	TDY Syncoros	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 2667
	TDY	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 1600
	TDY	NETT Trng New Equip Trng by Contractor at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 2800
	TDY	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 7067
01Aug91- 31Aug91		Period Totals:	PLAN ACTUAL REMAINING	0 0 386	0 0 12091

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
21Sep91-30Sep91	30-00180 AH-64 AC	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 80 Hr	0 0 0
	30-00180 AH-64 AC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 80	0 0 0
	Armbrust, J. CW3 AH-64 PI	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 160 Hr	0 0 1920
	Armbrust, J. CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 160	0 0 1920
	Caskey, M. GS12 Engineer	Data Reduction Reduce project data at Ft Rucker for Flt Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 36 Hr	0 0 432
	Caskey, M. GS12 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 36	0 0 432
	Dean, R. GS12	Data Reduction Reduce project data at Ft Rucker for Flt Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 72 Hr	0 0 864
	Dean, R. GS12	Resource Totals:	PLAN ACTUAL REMAINING	0 0 72	0 0 864
	Lester, G. CW4 AH-64 PI	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 160 Hr	0 0 1920
	Lester, G. CW4 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 160	0 0 1920

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Rent	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 2000
	Rent	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 2000
	TDY Dyncorps	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 6667
	TDY	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 4000
	TDY	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 10667
01Sep91- 30Sep91		Period Totals:	PLAN ACTUAL REMAINING	0 0 508	0 0 17803
01Oct91- 31Oct91	90-00180 AH-64 AC	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 8 Hr	0 0 0
	90-00180 AH-64 AC	Redeploy Return Test team and aircraft to Ft Rucker	PLAN ACTUAL REMAINING	0 Hr 0 Hr 10 Hr	0 0 0
	90-00180 AH-64 AC	Resource Totals:	PLAN ACTUAL REMAINING	0 0 18	0 0 0

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Armbrust, J.CW3 AH-64 PI	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 16 Hr	0 0 192
	Armbrust, J.CW3 AH-64 PI	Redeploy Return Test team and aircraft to Ft Rucker	PLAN ACTUAL REMAINING	0 Hr 0 Hr 40 Hr	0 0 480
	Armbrust, J.CW3 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 56	0 0 672
	Caskey, M. GS12 Engineer	Data Reduction Reduce project data at Ft Rucker for Flt Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 4 Hr	0 0 48
	Caskey, M. GS12 Engineer	Resource Totals:	PLAN ACTUAL REMAINING	0 0 4	0 0 48
	Dean, R. GS12	Data Reduction Reduce project data at Ft Rucker for Flt Test	PLAN ACTUAL REMAINING	0 Hr 0 Hr 8 Hr	0 0 96
	Dean, R. GS12	Resource Totals:	PLAN ACTUAL REMAINING	0 0 8	0 0 96
	Lester, G. CW4 AH-64 PI	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 Hr 0 Hr 16 Hr	0 0 192
	Lester, G. CW4 AH-64 PI	Redeploy Return Test team and aircraft to Ft Rucker	PLAN ACTUAL REMAINING	0 Hr 0 Hr 40 Hr	0 0 480
	Lester, G. CW4 AH-64 PI	Resource Totals:	PLAN ACTUAL REMAINING	0 0 56	0 0 672

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
	Rent	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 200
	Rent	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 200
	TDY Dyncorps	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 667
	TDY	Flight Test Conduct Flight Test Program at remote site	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 400
	TDY	Redeploy Return Test team and aircraft to Ft Rucker	PLAN ACTUAL REMAINING	0 unit 0 unit 0 unit	0 0 1000
	TDY	Resource Totals:	PLAN ACTUAL REMAINING	0 0 0	0 0 2067
01Oct91- 31Oct91		Period Totals:	PLAN ACTUAL REMAINING	0 0 142	0 0 3755
		Network Totals:	PLAN ACTUAL REMAINING	0 0 1142	0 0 36000

Time Period	Resource Name and Budget Code	Activity Name and Description	PLAN / ACTUAL / REMAINING	Total Resources	Total Expenses
		Project Totals:	PLAN	0	0
			ACTUAL	0	0
			REMAINING	1486	40133

Discussing the difficulties that are predictable at the very outset of the meeting, may help minimize the actual problems experienced.

- One predicable problem worth discussing thoroughly, is the critical requirement to **select a breakdown of work elements that will minimize inter-element dependencies.**

- Assure the group that all desirable visibilities will be easily addressed, once a carefully integrated work flow is developed. All performance measurement requirements will be satisfied but not to the detriment of a well developed plan.

If the session is to be successful, the final plan must accurately identify and resolve all necessary trans-organizational cooperation.

The Top Down Planning Method

Simply stated, the Top Down Structured Planning method identifies and completely resolves all modeling issues at each level of planning (from overview to detail) before proceeding with any further breakdown.
The three issues are:

1 - Goals

2 - Work Breakdown

3 - Work flow Identification and Integration

Of these issues, the identification of goals should be the most straight forward. If not, this critical issue must be resolved before any reasonable planning is possible.

Work breakdown can be a long tedious process, but if performed top down, it should still be relatively straight forward.

Work flow dependency identification is by far the most challenging problem to resolve especially as it intersects the various performing organizations. The entire success or failure of the planning effort in fact, hinges on your ability to extract these dependencies from your audience.

The difficulty factor is directly related to the work break down elements chosen. One selection of work elements may produce a clean easy identification of flow. Another selection may render flow identification impossible. The elements your audience will be inclined to suggest will probably produce the worst possible situation.

The Big Picture Plan

Goals

The big picture or project overview plan should be attacked first. Start by identifying major project goals.

The tendency will be towards too many goals rather than too few. The following goals are appropriate and any others mentioned should be dealt with later at lower level of planning.

1 - One or more overall project starts, or occurrences outside of the project work flow, that constrain the initiation of specific project tasks. These must include important deliverables produced by outside organizations, whose efforts will not be detailed within the plan itself.

2 - One or more overall project finishes, or final completions of various activities, that result in an outside deliverable. These should include only those deliverables that concern management and the customer.

3 - Major intermediate goals that are highly significant to top management or the customer.

Once identified, all of these important goals should be represented by events drawn in row 1 of ViewPoint. A Planning Screen time scale should be chosen that depicts all or most of the overall project time frame.

The Big Picture Plan

Work Elements

Take considerable time and care to select appropriate work elements at every level of the plan but be especially cautious here. Starting with the wrong highest level work breakdown is a sure path to doom. One golden rule of Top Down Structured Planning, is to quickly abandon any ill conceived work element break down and back up as far as necessary to correct the problem. Therefore, a little extra discussion now may save you a lot of grief later.

Ask the group to deliberately reorient their thinking away from their individual organizations and consider the project as a company wide cooperative endeavor. Consider **what** is to be accomplished, rather than **who** or **how** it will be accomplished.

Ask questions like:

- What large effort can be identified that we also recognize are fairly independent of all other efforts ?
- Can we identify any other large elements of work that depend very little on all other work?
- What are the major components of the finished product?
- What initial work precedes all other work?
- What final effort follows all or most of the other work?
- Are there efforts that do not fit inside one of the above, because they integrate and test many of these major components?
- If we were forced to break the work between geographically separated organizations that communicate poorly, how might we delineate the major efforts each organization would discharge?

From questions like the above, try to identify two to twelve major tasks as candidates for big picture work elements. Now sanity check these thoroughly before adopting them.

- Ask if they relate to the way the work is done. or
- who does it . or
- what the boss and customer want to see on a report.

A positive response to any of these questions should make the project manager doubly cautious and reluctant to adopt the suggested work breakdown.

Describe Work Breakdown Theory

You must assure the suggested work elements will require relatively few inter-element dependencies to fully integrate them.

If you are having difficulties soliciting a workable work breakdown, your audience probably does not clearly understand what you are seeking. Stop the process and review the basic theory of proper work breakdown.

Some of the important features worth reviewing are listed below:

- There is always a way to organize all work into a collection of major tasks that will minimize inter-task dependencies. Ask the group to visualize all the work on a giant screen fully integrated with all the necessarily work flow connections in place. Now, suggest they attempt to encircle as much work as possible such that there will be a minimum number of connecting lines intersected.
- Explain the objective is to isolate the most interactive activities onto separate individual plans. This object is best accomplished by first determining that most autonomous collections of work. Eventually we will further sub-divide these collections, but in a way that keeps the most intricately connected activities inside of a larger grouping. Ultimately, the most interactive collections become the smallest work elements identified.
- Suggest the group first identify major product components as a tentative workable breakdown. These can usually be developed fairly autonomously. The exceptions to this are initial trans-component analysis and design, then the final major component integration and testing. This approach seems to have value in almost any type of project.

The following examples of workable breakdowns may be usefully as an initial frame of reference for your discussions.

1 - Network System Development Project
- Systems Engineering and Design
- Hardware Development
- Software Development
- Product Integration and Testing
- Deployment (all Documentation, Marketing, Training etc...)

2 - Communications Product Development
- Systems Design
- Repeater Cluster
- Cabling
- Power Supply
- Field Test Equipment

3 - Tax Code Implementation
- Program Implementation Issues
- Software Systems Development
- Field Preparation Activities
- Staffing

4 - Computer System Development
- Requirements
- Prototype and Validate
- Manufacturing Requirements
- Tests
- Documentation
- Marketing and Technical Support

5 - Commercial Hardware Software Development Project
- Operating Environment and Tools
- Network System Stubs
- Basic Work Station
- Applications
- Systems Tests
- Product Support

6 - Internal Software Application Development and Implementation
- Overall Requirements
- Order, Invoicing and Receipt System Development
- Data Base Changes
- System and User Testing
- Deployment
- Network Preparation
- System Implementation

7 - Aerospace Development Project
- Systems Design
- Fuselage Modifications
- Engine Modifications
- Tail Section Modifications
- Product Testing
- Documentation and Training

Remember, if you are unable to fully integrate these elements in the next planning phase, you will have to backup and redo this important breakdown.

The Big Picture Plan

Drawing in Major Work Elements

Once you have decided to adopt a collection of suggested work elements, you can plan them, one at a time, by following these suggested steps:

1 - Ask **when** the effort might **start** and **place a floating event** at that date location on the screen. Each Major task should appear on a separate row below row 1. Keep the event name as small as possible (2 or 3 characters), but type in a fairly complete description for all of the events you use during Top Down Planning.

2 - Ask **when** this major effort might **complete** and **place a floating event** at that date location on the screen as well. The events representing the start and finish of the major task should have similar names (example... "Fab" and "FabC").

3 - **Place a hammock** in the same row as the two events. Type in an appropriate name and Activity Code 1 field. This code will be used later when we convert the hammock into a summary, so end it with an asterisk.

4 - **Tie the hammock to the two events** with the connect key. Should the audience wish to change the starting or finishing date of this hammock later, you can temporarily date an event to move it, then immediately remove that target date.

Ask the group to provide their very best initial estimate of when each major tasks might begin and end. The overlap of several major tasks will stimulate later questions about possible inter-element dependencies.

Once all work elements are drawn in, question the accuracy of the relative size of the various elements and their overlap in time.

The more thought put into these considerations, the more successful you will be during the following exercise.

The Big Picture Plan

Work Flow Identification

This step is of course the most critical step of all. You have taken great care to arrive at a collection of major work elements which should be fairly easy to inter-connect. Now we concentrate on identifying and incorporating these important connections into our embryonic plan.
We recommend the following sequence of questions and ViewPoint functions for accomplishing this step:

1 - For each major work element in turn, ask what allows this effort to start. Each answer will require a work flow connection to be performed. If necessary define a floating event immediately above another major task in order to identify a necessary deliverable. For example, if the Fabrication effort must wait for a specification from the Design effort, place an event at the appropriate date over Design called "Spec" and connect this new event to the starting event for Fabrication.

2 - For each major work element in turn, ask what other work element is constrained by the final completion of this task. In other words, what other work elements must wait for this element to complete, before it can complete all of its work. Each answer will require a work flow connection to be performed. If necessary define a floating event immediately above another major task in order to identify a necessary input from this task. For example, if the Fabrication effort must wait for the final specification delivered at the completion of the Design effort, place an event at the appropriate date over Fabrication called "FSpec" and connect the finish event of Design into this new event over Fabrication.

3 - Everywhere two or more major work elements overlap, question the group about a possible hand-off of something from one into the other. **All inter-element dependencies must be identified and incorporated into the plan.** Each answer will require a work flow connection to be performed. Define a floating event immediately above both major tasks in order to identify a deliverable from one task and a corresponding input into the other task. Connect these new events together in the correct work flow direction. For example, a deliverable occurs from Design (between "Spec" and "FSpec") that feeds Fabrication, we define a floating event called "2ndS" over Design and connect it to a newly defined "Spec2" over Fabrication.

4 - For each major goal in row 1 ask the group to identify all connections from that event, or to that event. Make sure all start events connect into all the necessary major work elements and all finish events are constrained by the appropriate achievements from the various major work elements. It may again be necessary to define additional events that represent deliverables needed to achieve the major goals, place them over the appropriate tasks and connect them into the correct major goal. For example, a major event "Beta" requires a deliverable from Fabrication called "Fbeta". After defining the new floating event "Fbeta" over Fabrication we connect it to the major goal "Beta" up in row 1.

If the number of required connections to complete the above steps becomes prohibitive, you have chosen the wrong work breakdown.
You must then backup in the process and start over again with more appropriate major work elements.

On the other hand, if you have been successful and all parties present fully endorse the big picture plan, you are well on your way to a completely integrated project plan. Any unresolved issues should be addressed before proceeding with further planning.

If any key players are missing from the session, review the plan with them and obtain their buy-in as well. However, if this can not be accomplished, wisdom dictates that you reconvene the entire group until you have complete agreement on the overall project plan.

Intermediate Planning levels

Linking them to the Higher Level Plan

Once the big Picture plan is complete. you can concentrate on expanding each major work element in turn. You will often work with a different group than before and a different group for each work element. The following network setup steps should be performed to set up a network detailing each major task. These steps can be performed before the next planning session.

1 - Set up a node on the ViewPoint Network Tree for each major task in a higher level node (for example, the Big Picture Plan). This is accomplished with Shift arrow key combinations. Each new node should be named after the major task to be expanded. (See page 11, Concept Network)

2 - Using COPY PASTE, make a copy of only the events immediately above a given major task and PASTE that COPY in row 1 of the corresponding lower level network. (See page 11, the 4 events in row 1 of Concept Network)

3 - **Link these like named events by connecting them together across screens.** Make sure that you connect only like named events. Also be sure to establish connections in the correct direction. The following guidelines and suggestions should help.

Events in the Big Picture (or intermediate planning levels) are of two logical types:

1 - **INPUTS which feed into a major task** and constrain the starting of work within another task. The first event along any major task is always an INPUT, fed by one or more completion events (DELIVERABLES) representing the completion of work in other major tasks. (See page 11, the events "Cn" and "Info" are inputs to the "Concept" Task.)

2 - **DELIVERABLES which feed out of a major task** and allow work to start within another major task. The last event along a major task is always a DELIVERABLE, representing the completion of all the work within the task and feeding another major task, or major event. (See page 11, the events "Cnpt" and "ConC" are deliverables from the "Concept" Task).

INPUTS should always be connected top down and DELIVERABLES should always be connected bottom up. You should find the following suggested sequence for making trans-network connections convenient and error proof.

1 - **First, connect the start event over any major task top down to the like named event in the lower level network.** (See page 11, the connection from "Cn" in Product xx network to "Cn" in Concept network).

2 - Next, connect the **finish event**, previously copied into the lower level network, **bottom up into the like named event in the upper network** (it will be at the end of the major task). (See page 11, the connection from "ConC" in Concept network to "Conc" in Product xx network).

3 - Then, you should TRACE the remaining intermediate events (over the major task) in the higher level network. Carefully determine if they represent deliverables or inputs as described above.

4 - Starting the connection in the upper network, **connect** like named **inputs top down**. (See page 11, the connection from "Info" in Product xx network to "Info" in Concept network).

5 - Starting in the lower level network **connect** like named **deliverables bottom up**. (See page 11, the connection from "Cnpt" in Concept network to "Cnpt" in Product xx network)

Intermediate Planning levels

How many levels are required?

Once all events over a major task have been connected to the like named copies in the lower level network, decide whether an additional intermediate expansion of that work element is necessary or whether that work element can now be detailed.

The second golden rule of Top Down Structured Planning is detail the work as soon as possible. Avoid superfluous levels of planning. Limit the number of activities that appear in a single network to a reasonable number.

We feel forty to fifty activities represents an upper limit. Twenty to thirty activities is usually more desirable.

If the work element task can be expanded (to the appropriate level of detail), with a reasonable number of Activities, complete the expansion (with a **detailed plan**). Otherwise, an additional **intermediate plan** will be required.

Intermediate Planning levels

How to perform an Intermediate Expansion of a Work Element

Approach an intermediate expansion much the same as the big picture plan. **The main difference is the goals for this level of the plan are established in row 1 and are already connected into the higher level plan.** (See page 11, the 4 events in row 1 of Concept Network)
Therefore, simply repeat the steps described above for the big picture plan including:

1 - **The Big Picture - Work Elements**

2 - **The Big Picture - Drawing in Major Work Elements**

3 - **The Big Picture - Work Flow Identification**

4 - **Intermediate Planning Levels - Linking them to the Higher Level Plan**

If the work element task can now be expanded with a reasonable number of Activities, complete the expansion (with a **detailed plan**). Otherwise, another **intermediate plan** will be required.

Top Down Structured Planning

Each intermediate expansion of a work element will also require an expansion of the appropriate Activity Code 1. For example, if a task called Hardware has a code of "HDWR" and we wish to expand this major element into Engine Hardware, Frame Hardware and Body Hardware; the corresponding codes might be "HDWRENG", HDWRFRM" and "HDWRBDY" respectively.

Intermediate Planning levels

How to perform Detailed Expansion of a Work Element

The detailed plan that completes the expansion of a work task simply involves identifying detail activities for that task and connecting the detail with the events in row 1. Make sure all in-coming inputs and all out-going deliverables are connected with the correct activities. (See Page 11, The detailed network "Cabinet 1")

Using F10 (LOCAL mode) and the Activity Editor, install the correct Activity Code 1 into all the activities and events in this network. Finally, return to the level above and CHANGE the HAMMOCK corresponding to this network into a SUMMARY.

Side to Side Connections across Networks

Following the rules and suggestions of Top Down Structured Planning, will obviate connections between networks on the same Network Tree level. Since all integrating connections are accounted for (in advance) in the network above, no side to side connecting should be required at an intermediate level of planning.

It is usually desirable to finish up with detailed network plans corresponding to a single work component, performed by a single organization. For example, the design on a software application is performed by your Design Department.

To this end there may be quite a few dependencies across the several performing organizations that work on the component. Say for example, 12 design specifications must be given to the Programming Department and in turn, 12 unit tested Programs must be given to the Quality Control Group for systems testing.

As reasonable compromise to the no sideways connect rule, utilize connections only between detailed "peer" networks (those with no networks below them that also share a common "parent" network). This will often achieve a more readable parent network.

This is a dangerous compromise and should be avoided if possible. If used, every side-to-side connection should be an indirect attachment through events in both networks. Avoid direct activity to activity connections. It is also recommended events highlighting side-to-side connections be deliberately placed in rows below row 1. These intervening events make the trans-network dependency more visible and understandable.

APPENDIX C. ABBREVIATIONS

ATTC	U.S. Army Aviation Technical Test Center
CPM	Critical Path Method
DOS	Disk Operating System
LAN	Local Area Network
MIS	Management Information System
PC	Personal Computer
PE	Practical Exercise
RDTE	research, development, test and evaluation
TRMS	test resource management system
TSR	Terminate and Stay Resident
T&E	test and evaluation
VP	ViewPoint
XO	expenditure order

APPENDIX D. REFERENCES

1. Methodology Investigation, "Aviation Test Management System Concept Development," November 1990.

2. ATTC Regulation 10-1, "Organization, Mission and Functions Manual," 1 October 1990.

3. ATTC Memorandum 70-12, "Aviation Test Director's Handbook," 10 December 1990.

4. User's Manual, "ViewPoint Project Management Software," Computer Aided Management, Inc., 1989.

5. User's Manual, "ViewPoint Presentation Graphics," Computer Aided Management, Inc., 1989.

APPENDIX E. DISTRIBUTION

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